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The AUTOMOBILE

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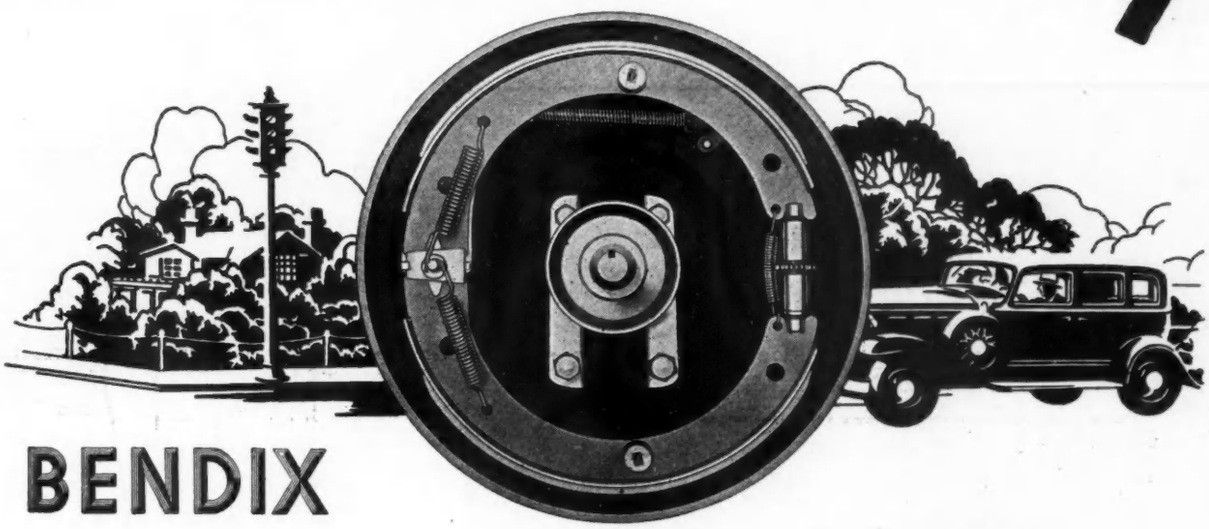

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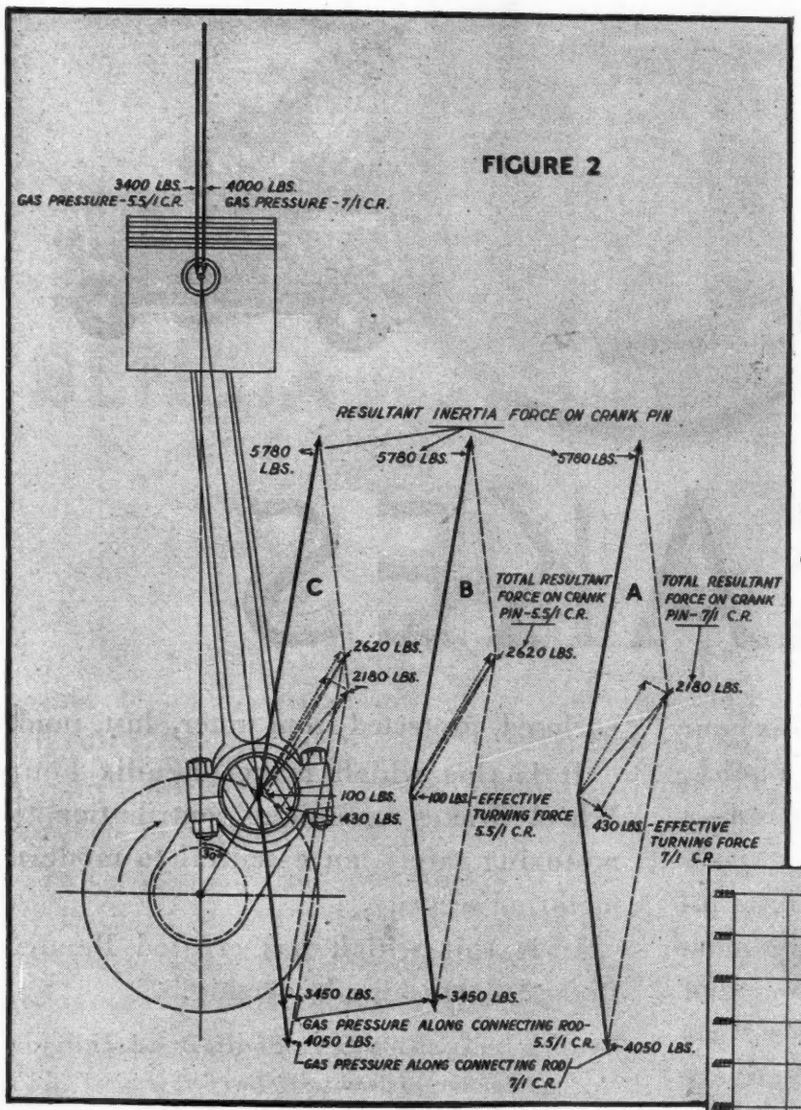

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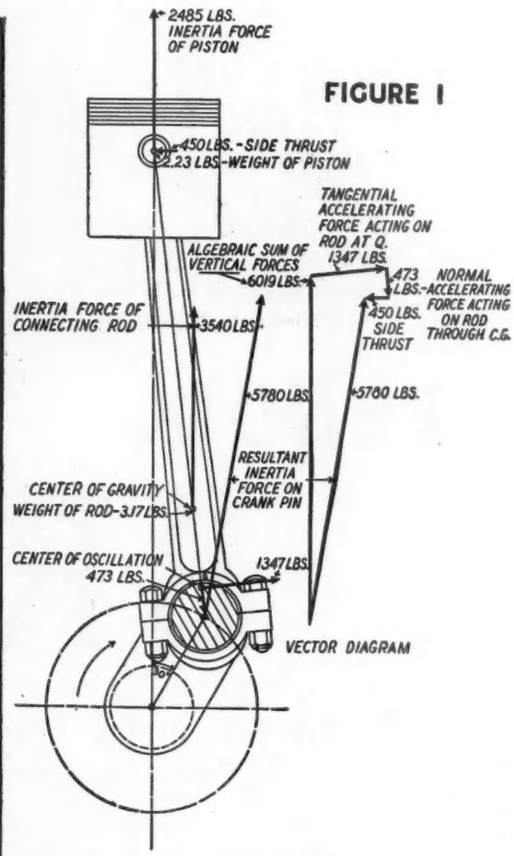

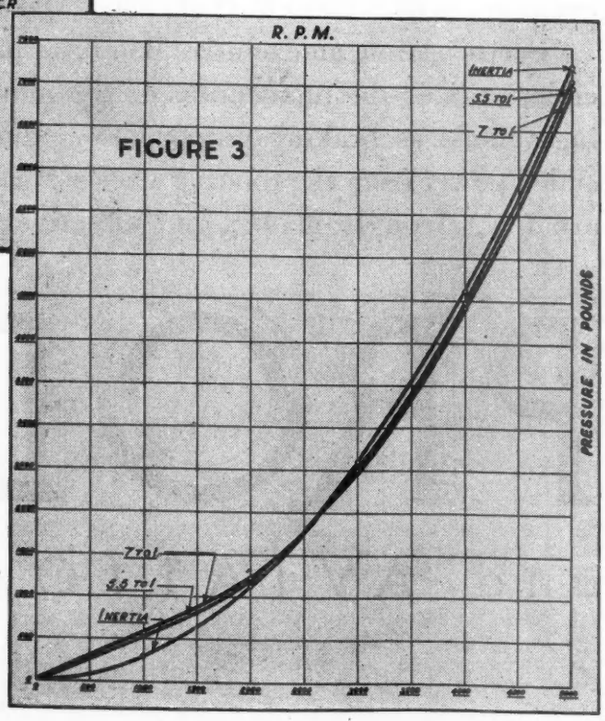

FIGURE 1 (*Upper right*)—*WITHOUT GAS PRESSURES*—*Vector analysis of instantaneous forces acting on connecting rod and crank-pin at assumed speed and position.*

FIGURE 2 (*Directly above*)—*WITH GAS PRESSURES*—*Vector analysis of instantaneous resultant inertia force and gas pressure acting on the crank-pin for* (**A**) *7.0 to 1 compression ratio and* (**B**) *5.5 to 1 compression ratio.* (**C**) *shows vector diagrams* **A** *and* **B** *superimposed on crank-pin.*

FIGURE 3 (*At right*)—*Mean crank-pin pressures at various engine speeds for 5.5 to 1 and 7.0 to 1 compression ratios. Also curve of mean pressures which would be caused by inertia alone.*

lowers extreme *Bearing Pressures*

THE increased gas pressures that result from higher compression ratios actually *decrease* extreme crank-pin bearing loads.

The reason for this is that gas pressures are *opposed to* and *less than* the enormous inertia forces of high speed operation which are the real causes of extreme crank-pin bearing loads. Gas pressures therefore reduce the mean load on bearings at those speeds which produce greatest strain.

The fact that the higher gas pressures produced by higher compression *decrease* the mean average force acting on the crank-pin at high speed and yet *increase* the turning moment is due to their effect in changing the direction of the effective force at the same time, so that it is more nearly perpendicular to the crank. A simple vector analysis given on the opposite page explains this seeming paradox.

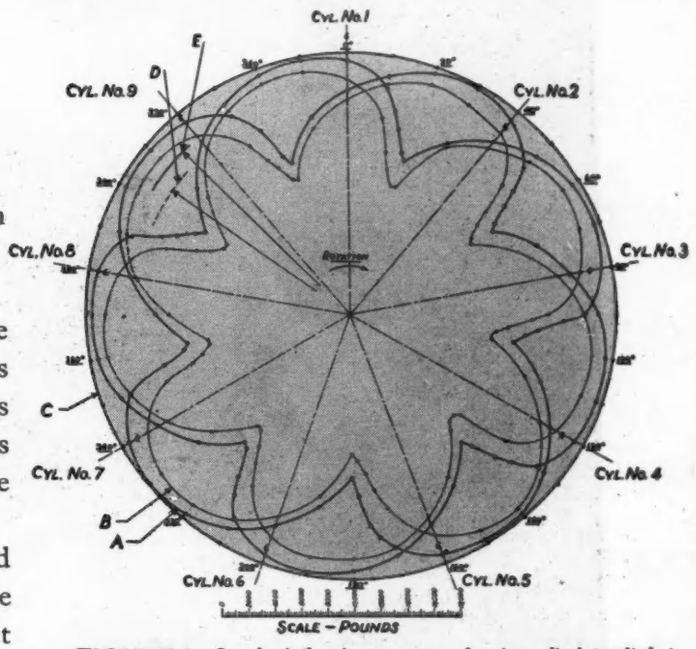

FIGURE 4—*Crank-pin bearing pressures of a nine cylinder radial aircraft engine during one complete cycle at a speed of 1900 r.p.m. with* (A) *compression ratio at 5.5 to 1 and* (B) *with compression ratio at 7.0 to 1.* (C) *represents the inertia force due to rotating and reciprocating weight.* (D) *shows mean force for combined inertia forces and gas forces for 7.0 to 1 compression ratio.* (E) *shows same for 5.5 to 1 compression ratio.*

Figure 1 shows a piston, connecting rod and crank of an eight-cylinder automobile engine, now in production, at 30 degrees past top dead center. If the engine were turned at a speed of 4000 r.p.m. with no gas pressure exerted on the piston, the connecting rod would exert a force of 5780 pounds on the crank-pin at this position in the cycle. The vector diagram, by means of which the inertia force on the crank-pin was determined, is also shown in Fig. 1.

Figure 2 shows the piston, connecting rod and crank at 30 degrees past top dead center as before with gas pressure forces of 3400 pounds and 4000 pounds, corresponding to compression ratios of 5.5 to 1 and 7.0 to 1 respectively, acting downward on the top of the piston. These gas pressure forces, transmitted through the connecting rod, add vectorially to the combined inertia and gravity force of Fig. 1, resulting in single forces on the crank-pin of 2620 pounds and 2180 pounds at 5.5 to 1 and 7.0 to 1 compression ratio respectively. The vector diagrams by which these forces were determined are also shown in Fig. 2.

Division of the single resultant crank-pin forces on the vector diagrams into their respective tangential and radial components shows that the effective turning forces at this crank position are 100 pounds at 5.5 to 1 compression ratio and 430 pounds at 7.0 to 1 compression ratio.

Figure 3 shows curves of mean crank-pin pressures at various engine speeds for the two compression ratios, together with a curve of mean pressures which would be caused by inertia alone. At low engine speeds, where the crank-pin bearing loads are too small to be of importance, the combined gas pressure and inertia loads are greater than the inertia alone and are slightly increased by the increase in compression. At speeds above 2500 r.p.m., however, the inertia forces begin to increase rapidly toward high values, and becomes greater than the opposing gas pressure forces. And therefor, at the higher speed, any increase in compression causes a decrease in the total mean pressure on the crank-pin bearings.

Figure 4 demonstrates this point even more clearly by means of a polar diagram showing magnitude of resultant force on the crank-pin of a radial airplane engine.

The decrease in *pv* values for bearings at high engine speeds is ONE of the advantages to be obtained by increasing compression ratio. Such a change in engine design also results in: TWO—Increased power, which produces faster acceleration, higher top speed, and generally improved performance, THREE—Less heat to cooling water, FOUR—Less heat to exhaust, FIVE—Greater fuel efficiency. Higher compression does NOT result in increased engine weight. It does NOT result in increased engine cost.

We shall be glad to help you on any of your problems where our experience with engines of higher compression ratios may prove valuable to you. Ethyl Gasoline Corporation, Chrysler Building, New York City.

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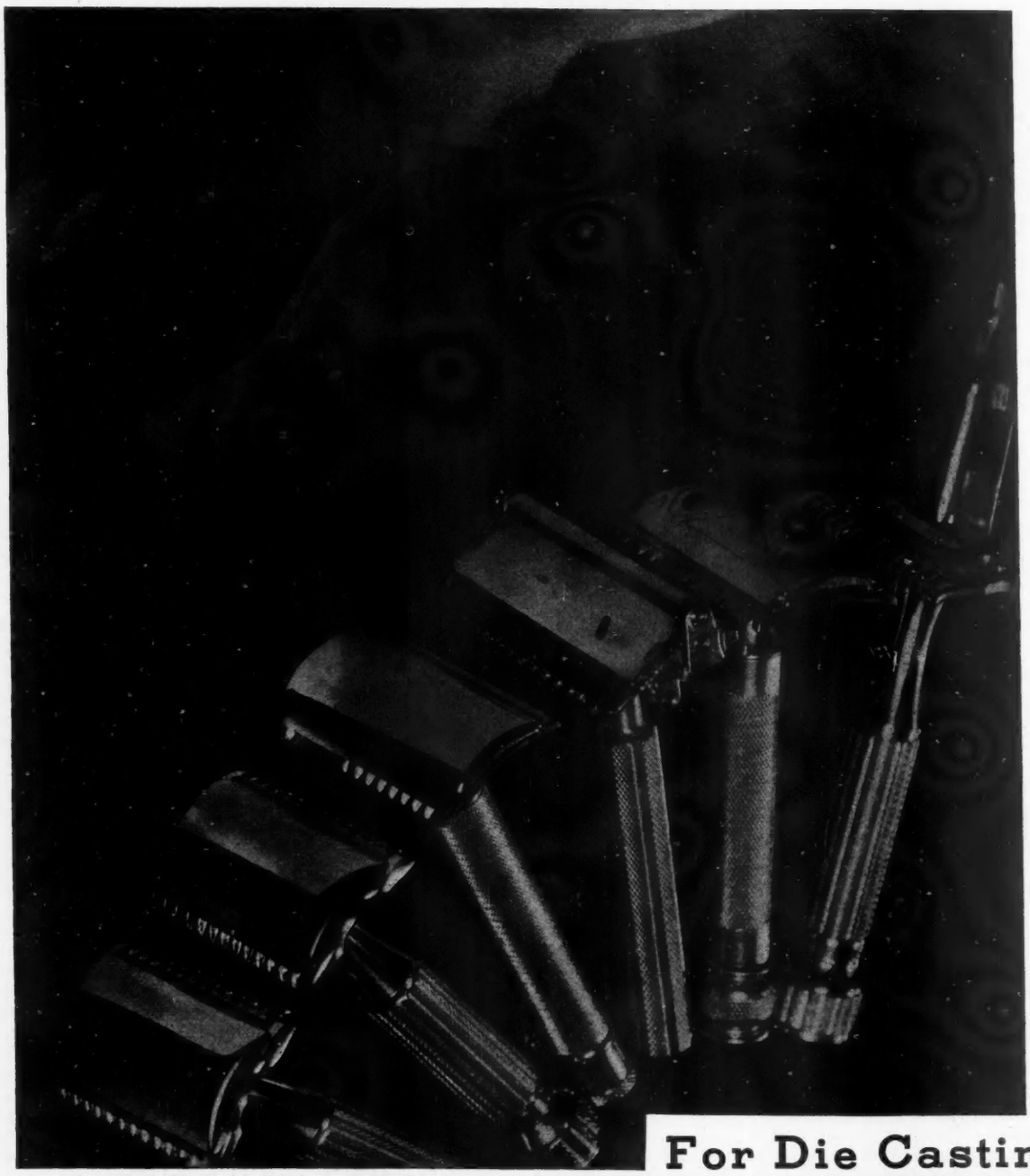

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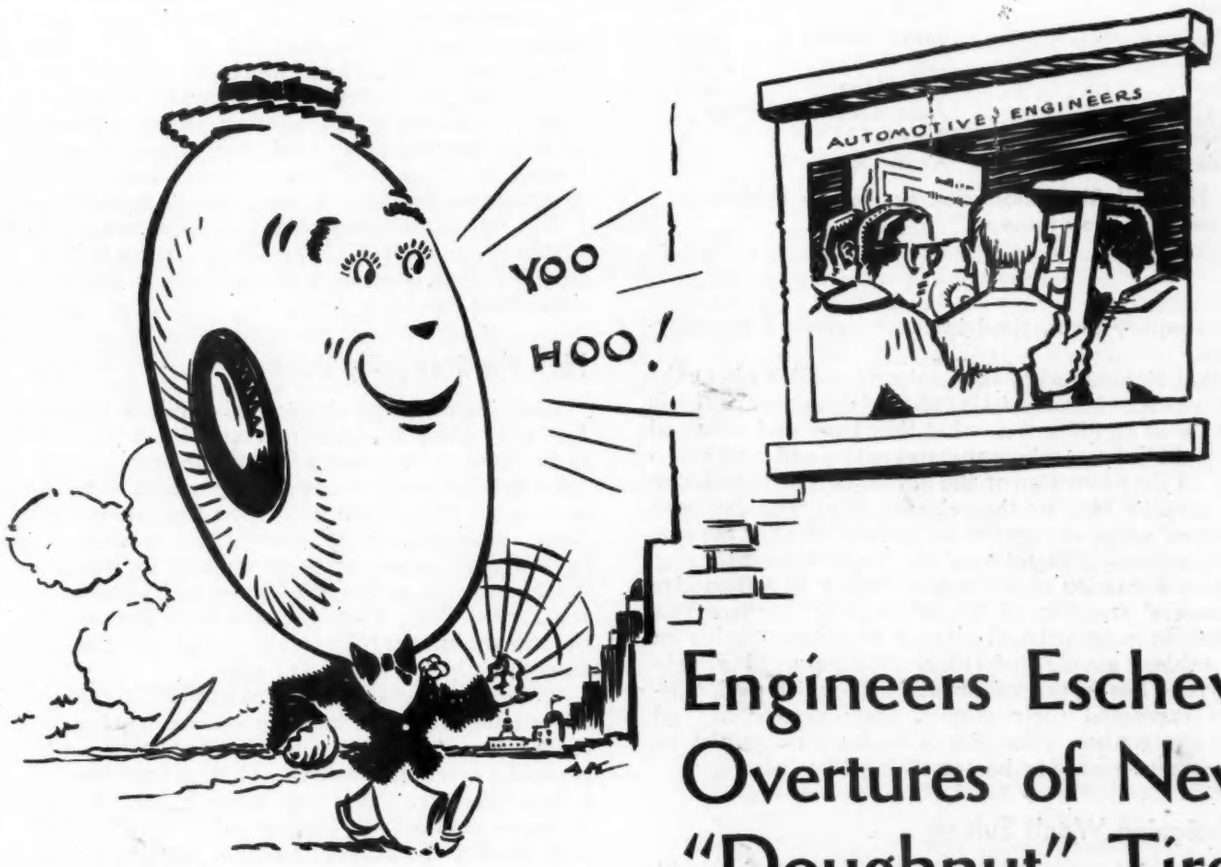


Engineers Eschew Overtures of New "Doughnut" Tires

Car designers openly oppose move to equip 1933 models with low-pressure pneumatics and tire engineers speak volumes in not discussing performance characteristics of jobs submitted to tests

by Norman G. Shidle

NEVER in the history of the automobile business has any new design feature made its way on to motor cars as standard equipment against such universal opposition within the trade as "doughnut" tires bid fair to do in 1933.

Every innovation in car design has been opposed by some people in the industry, to be sure. And the fellows who dug their toes in to fight against the novelties usually have been engineers. Eight-cylinder engines, four-wheel brakes and free wheeling have become integral parts of standard motor car design in spite of rather general resistance from designing engineers. Sales department pressure was responsible for widespread adoption of all these features.

Yet in each of these past instances, it was easy to find a strong minority of technical men who saw excellent possibilities for the new feature and who, early in the game, favored going ahead with the new development.

But today, engineers who actually want to put "doughnut" tires into their 1933 designs are scarcer than clean-shaven Bolsheviks. There may be some passenger car designer hiding away in the corner of some laboratory who is smiling in anticipation of incorporating 9-in. tires in his next design, but we haven't run across him.

And there may be some tire engineers who really are enthusiastic about the immediate adoption of extremely low pressure tires, but a reasonably thorough search hasn't revealed them either. Even such tire engineers as have voiced public opinions on the matter express the fervent prayer that the industry will content itself in 1933 with only moderate increases in tire size, instead of jumping impulsively to the larger sizes so

"Doughnut" Lexicon

Dr. B. J. Lemon, U. S. Tire & Rubber Co., showed this compilation of low-pressure tire trade-names at the White Sulphur Springs meeting of the S.A.E.:

General	Streamline Jumbo
Goodyear	Airwheel
Goodrich	Super Cushion
Firestone	Air Balloon
U. S.	Super Balloon
Kelly	Low Air
Miller	Autoplane
India	Aero Cushion Balloon
Mohawk	Air-Mail
Pharis	Ample Air

The Tire and Rim Association has tersely dubbed the new tire "Low Pressure."

picturesquely dramatized in much current tire advertising.

What tire engineers *have not* said publicly about the performance characteristics of the "doughnut" units is perhaps as significant as what they have said. Several tire technical men who were most active and most articulate in the promotion of the advantages of the balloon tire back in 1923 or thereabouts, have thus far been definitely silent as regards the possibilities for the currently promoted "doughnuts" or "super-balloons."

Open discussion at the recent Society of Automotive Engineers' meeting at White Sulphur Springs was similar in general trend to that of informal talks on the subject among individual engineers. The only difference lies in the vehemence with which said engineers expressed their doubts, their skepticism and their antagonism. The gist of engineering opinion at the moment seems to be something like this:

Redesigning Won't Suffice

"Automobiles can be redesigned so that they will perform satisfactorily with the new 'doughnut' tires. To achieve this result, however, will involve much expense in manufacturing, as well as design changes, considerable experimenting and much difficulty.

"Even after all the other elements of the car have been brought into balance certain disadvantages will remain which we see no present way of overcoming. Important among these is achievement of adequate braking capacity in the space available with the very much smaller wheels. Other possible disadvantages which may remain to a greater or lesser degree may be instability at high speeds, greater danger when blowouts occur, increased tire 'squeal,' harder steering in general and much harder steering when parking.

"The only offsetting advantages we see are doubtful; first, the new tires enhance the appearance of the automobile considerably in the eyes of many people, including engineers. Second, cars which now ride poorly give a better ride when equipped with the 'doughnut' tires, but no improvement in riding qualities is apparent on a car already riding well. Some improvement in anti-skid qualities also is generally admitted.

"The public, therefore, would be paying a considerable price to procure very doubtful advantages were the new 'doughnut' tire to become standard equipment."

But all that is only what a majority of engineers think. These same men are agreed that what they think is going to have little to do with what actually takes place. The present trend of sales department thinking is such that the engineers fully expect to be given orders to put "doughnut" tires on their lighter 1933 cars as standard equipment.

How do such situations come about?

No man can yet write the full and accurate story of this particular commercial development which has aroused such universal engineering opposition. "Facts" on a matter of this kind are hard to get; they don't appear even in the written records of the inter-office memoranda of individual companies. "Facts" in a matter of this kind consist of the reaction of one man's mind to the actions of another man; or hurried decisions following long word-of-mouth conferences generated by activities of commercial rivals and driven to their conclusions by the sharp lash of competition.

But one can climb to the top of an imaginary tree and take an outsider's look at what seems to have happened. When one does that, the panorama spreads out something like this:

How the Stampede Began

One tire company, doing exclusively a replacement business, came into the market with a tire of very large cross section and very low pressure. It dramatized this tire and its advertising and sales promotion, got the public interested in it and began to sell some tires. Immediately the larger tire companies seemed to feel that no one competitor could be permitted to make any sales by reason of an exclusive product. The word came down from the tire sales departments to the tire engineers: "We want a 'doughnut' tire, quick!" Something like a stampede began.

While the engineering departments got busy, the advertising went out, large in volume and dramatic in character. And the new tire unquestionably had marked advertising values. It improved the appearance of the car. That was number one. It was big in section and soft to feel—a fellow didn't have to be an engineer, the average man thought, to see at once that a car would ride easier on one of these big, soft cushions than it would on a balloon tire of ordinary section and inflation! Yes, it had an immediate appeal to the lay mind. And everybody started to sell some.

Public Likes "Doughnuts"

Next, alert minds in the sales departments of passenger car companies, ever fearful of letting competition get the jump, began to say: "Here, there's a lot of public interest in these new 'doughnut' tires. Some of our competitors may put them on as optional or standard equipment and thus have a sales talking point which we don't have. We'd better have them at least as optional equipment right away."

And again the word went down to the engineering department, this time of the car companies, that the sales department wanted "doughnuts," at least as optional equipment. The engineering departments argued against jumping too fast in every case, so far as we know—still are arguing in many instances. But "doughnuts" are optional equipment right now on several passenger car lines and will be optional on several more before long. The most virulent resistance to the new tires, incidentally, came from the engineering departments of some of those companies which were first to adopt the tires as standard equipment.

A few car engineers, we are told, are less vigorously opposed to the new tires today than they were several

months ago when they first began experimenting with them.

And that's where the matter stands today.

Even with this favorable opinion of "doughnuts" or super-balloons, engineer B. J. Lemon of U. S. Rubber thinks we're in grave danger of trying to move too far too fast. "Had the National Automobile Chamber of Commerce and the original equipment tire makers recognized the magnitude of the changes that super-balloons may eventually require, and the immediate expense of the necessary development work," he says plainly, "the movement might have been retarded and adequate time allowed, as in 1923, to work the tire into the design of new cars. Now it is too late for any retardation pressure to become effective. Very likely super-balloons will be standard equipment on some light and medium weight cars in 1933, unless serious defects not now apparent develop in the meantime."

Car company executives, imbued with the idea of giving the public what it wants, might well recognize two distinct ways of approaching this super-balloon question. One is to ask: "Can our cars be made to operate adequately with the new tires?" The other is to ask: "Will the advantages to be gained from application of these new tires possibly be enough to compensate for the expense, trouble and disadvantages which inevitably come along with such application?"

Most of the problems arising out of application of these tires to present and future car designs have already been carefully studied by both tire and car engineers and the design as well as the service problems involved are capable of detailed analysis.

"Doughnuts" Optional

The following makes of automobiles have announced to the trade and the public that they are offering, as optional equipment, "low-pressure" tires:

Graham	Triple oversize (7.50)
Plymouth	
Chevrolet	
Studebaker	
Rockne	Quadruple oversize
DeSoto	Quadruple oversize
Nash	15 x 5.50

Tire manufacturers have stocked their dealers with sextuple oversizes for Chevrolet, Ford and Plymouth.

High-pressure discussions of "low-pressure" tires have reverberated throughout the industry since the first super-oversizes were offered as replacement equipment.

The above article will be followed by others, each taking up some specific problem involved should car factories adopt these tires as standard equipment for their 1933 models.

P. M. Heldt will take up some mathematical considerations and James W. Cottrell will discuss technical phases of this currently important automotive problem in early issues.

New Chilton Flat Rate Book Lists 353 Operations for 492 Chassis

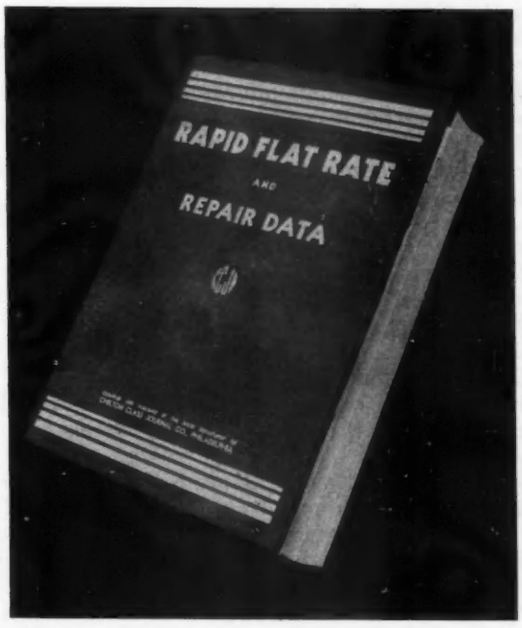
BACKED by a rich tradition of acceptance as a handbook and guide for the repair and maintenance of automobiles, the 7th Edition of the new and improved Chilton Rapid Flat Rate book is coming off the press this week. More than 210,000 copies of the early editions are in circulation.

To automotive manufacturers, particularly their engineers, service organization, and sales department, this handbook is of great significance. To begin with, it places in the hands of at least 30,000 buyers of authorized parts, a condensed factory parts price list for 492 different chassis. For these it lists 353 distinct operations with complete flat rate data for each one.

Here for the first time is found a complete section on front wheel alignment data for each car model. A unique feature of this section is the fact that it gives not only total caster but also the amount of axle caster. This section will give the engineer some much needed material on front wheel alignment practice.

Another interesting feature of the individual instructions for each car is data on the serial numbers, tappet clearances, valve and ignition timing, chassis unit lubricant capacities, and other pertinent items of adjustment and repair.

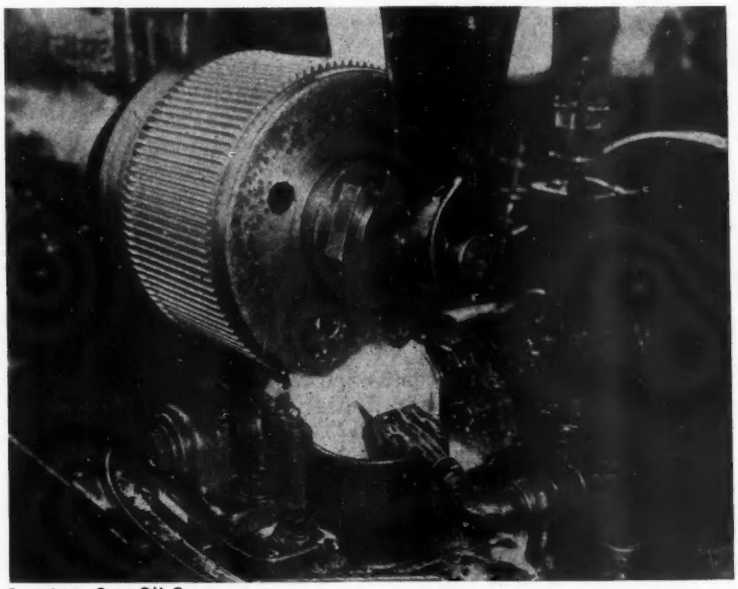
It has been an established practice in certain factories to distribute copies of this handbook to authorized service stations and distributorships. But by far the most important development in this direction is its use by dealers as a guide in estimating reconditioning costs on trade-ins, thus providing the wide-awake dealer with a new tool for better profits.



Published by the Chilton Class Journal Company. Price, $4; only with subscription to *Automobile Trade Journal* ($2 yearly).

Production men can now reduce inventories of cutting fluids because they now can work with just two basic materials—soluble oils and sulfurized oils.

Proper test procedure will point to proper selection and develop most economical use.



Courtesy Sun Oil Co.

by Joseph Geschelin

Choice of Cutting Fluids Simplified by

THIRTY-FIVE million gallons of cutting fluid were used in the automotive industry during the past year. A couple of years back, when production was humming, more than double this amount was used to build motor vehicles.

Cutting oils, then, are something to be reckoned with. And it's small wonder therefore that there should be such concerted activity among producers and their research chemists in an effort to simplify cutting fluid utilization; to introduce a very few products covering the entire gamut of metal cutting needs and to snatch the veil of mystery surrounding the art.

Last year we published two articles dealing with the utilization of cutting fluids. In the second of these (1), after a study of the actual practice in 36 large metal working plants, we concluded that the outstanding feature of the situation was an absolute lack of standardization. Also that standardization was hardly likely or desirable in view of the many uncontrollable or rather not comparable factors that enter into the picture. Briefly they are such things as machines, feeds and speeds, tools—their form and methods of grinding, operating conditions, and the like.

Yet great economies are at stake—costs, tool life, productivity, rejections due to faulty finish—just to mention a few.

What do the cutting fluid producers intend to do about it? Although metal cutting has lagged they have been busily developing two types of products which may meet the majority of needs. Water soluble oils on the one hand; some acceptable sulfurized oils on the other. The latter group consists of sulfurized mineral oils capable of dilution so as to produce the sulfur content required and a fatty sulfurized base which may be mixed with mineral oil to achieve the same result. Practical tests will determine whether only one or both are needed.

Having a good grasp of the fundamentals involved, the production man in cooperation with the chemist can find modifications of these basic types of materials to answer the greater variety of applications in any plant. Need we say here that certain special operations may require other materials? We think not. Because the few boundary operations can be readily spotted.

Before plunging into the details of the new developments it may be well to review the basic functions of a cutting fluid. In varying degrees they are: REFRIGERATION—LUBRICITY—FLUIDITY (variously described as wetting or penetration). Secondary functions comprise such considerations as quality of finish, vehicle for washing away chips, and rust preventive.

If we could determine on each job to what extent each of these requirements must be met by the cutting fluid, we would have the problem *licked.* For the answer would point to the type of material whether it be soluble or sulfurized and would determine the degree of dilution—the most important element in cost.

One of the interesting developments is the light shed on the problem of metal cutting by the recent research in connection with E-P lubricants for hypoid gearing. As one prominent investigator comments in recent correspondence, "The extensive research conducted by various automotive engineering laboratories on the load-carrying or anti-scuffing capacities of certain lubricants has thrown considerable light on our cutting oil problems.

"This work, carried on by means of various testing machines such as the Timken and Mougey lubricant testers, has indicated that the addition of small quantities of sulfur to a lubricating oil increases its load-car-

(1) Extreme Variation in Cutting Fluid Practice Brought Out by Survey, by Joseph Geschelin, *Automotive Industries,* May 2, 1931.

rying capacity or resistance to scuffing from two to five times. In addition, these tests have indicated that some sulfur mixtures have a decided effect on the wear between two metals moving in contact, so that it is necessary to carefully balance such compounds in order to secure the greatest efficiency. It might be interesting to note in this connection that lard oils on these tests show an increased load-carrying capacity over ordinary lubricants but do not approach the high load-carrying capacity of the sulfurized oils."

Needless to say the use of sulfur is not new. What is new is the fact that many more people are recognizing its possibilities, and their activity is bound to bring about a happy solution. This attitude is reflected by the following comment, "Our ideas on cutting fluid problems have changed recently due to the results that have been obtained with straight sulfurized mineral oils. We have also in the past two years found that viscosities on cutting fluids of from 100 to 200 at 100 deg. F. are maximum.

"Heavier oils are not nearly as efficient, cause excessive heating of tools, and in many cases set up friction that actually causes tearing of the machine to pieces." The same investigator says further, "Fatty sulfur base and sulfurized mineral oils have replaced at least 75 per cent of straight lard oil and lard oil mineral oil combinations. Many plants that some years ago were using lard oil combinations and later on used sulfurized lard are now using soluble oils on cutting machines."

Research

Another large organization in the metal cutting field summarizes their present thinking in this fashion, "First, to what extent sulfur base cutting fluids may replace lard oils or lard oil mixtures, it seems to be accepted in the metal working industry that lard oil is, or the lard oil mixtures are, the very best for many types of work.

"However, it has been found that it is practical not only from the economic standpoint, but also from the standpoint of producing results, to replace such products with sulfur base cutting fluids. Almost without exception, such products are sulfurized fatty materials, mixed in various proportions with petroleum oil bases.

"Experiments alone will determine just what fatty material to use, but, of course, it is natural to turn to the most favorably known fat, namely, lard oil, as a substance to be sulfurized.

"The method of sulfurization may have a lot to do with the working qualities of the finished product. In ordinary cutting fluids, it is quite essential that the sulfur be chemically combined, and here under ordinary conditions we have the choice of attaching sulfur by an ordinary suitable heat-controlled reaction, or by means of the well-known sulfur chloride reaction. In either case, sulfur is more or less firmly chemically attached to the molecule, and when the products are properly finished, there should be very little separation of sulfur as such.

Chemistry is Important

"Assuming that sulfur has been properly attached, and that the finished product is of good quality, sulfur base cutting fluids may replace lard oils or lard oil mixtures in all classes of machining operations where high carbon or tough cutting steels are used, such as chrome nickel, chrome manganese, etc.; in many forms of pressed steel work and in actual cutting work where very heavy cuts are involved, with coarse feeds and high speeds, where an excessive degree of heat is generated at the point of the tool, and where the likelihood of abrasion of the tool is great.

"In general, the more severe the conditions and the greater the likelihood of generation of heat, the larger the percentage of fatty material and sulfur is required. It does not seem to be a matter of increased viscosity, particularly, for in some actual experimental work it was found that an admixed mineral oil of lower viscosity quite appreciably enhanced the cooling properties of the fluid.

"There is absolutely no question but that addition of sulfur produces a marked cooling effect. In experiments which were repeatedly checked, cutting fluids of similar characteristics were used alternately with and

Table I. Characteristics of commercial cutting oils most frequently used in Mid-west metal cutting plants. No. 7 is used in broaching and heavy cuts. The others are for general utility on all types of machines

	1	2	3	4	5	6	7
Gravity (Baume)	20.5	27.5	23.5	21.2	25.2	19.9	22.5
Flash, Deg. F.	335	330	355	310	345	315	355
Viscosity, Sec.	143 @ 100	91 @ 100	92 @ 100	207 @ 100	117 @ 100	114 @ 100	245 @ 100
Sulfur, Per Cent	4.24	0.96	3.82	2.18	2.43	1.19	4.3
Color	Dark	Dark	Dark	Dark	Dark	Dark	Dark
Fat, Per Cent	None	None	None	None	None	None	15

without sulfur, and a very noticeable difference in temperature of work was observed. In order to prove that sulfur exerted a cooling effect, an entirely different cutting oil was formulated, which gave equal or even better results as to finish, under rather adverse conditions of operation, but was noticeably deficient in cooling properties.

"To be more specific, sulfurized cutting oil products have been used very satisfactorily on such machines as Warner & Swasey, hand screw machines, automatic screw machines, gear cutters, general types of chucking machines, such as Bullards, Jones & Lamson machines, etc.

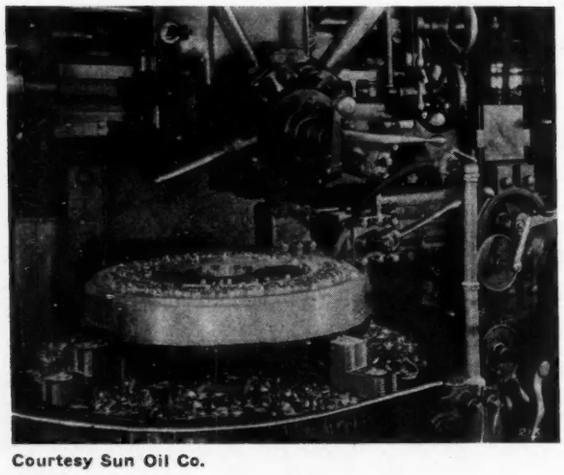
"Some concerns use sulfur base oils in machining brass, but here, under extreme conditions, there may be heat enough to partially dissociate the oil at the point of the tool and enough hydrogen sulfide will be liberated to slightly discolor brass parts. However, as brass is easily worked, a much greater dilution than ordinarily used will probably avoid all staining."

New Study Reported

Here is the report of a series of practical tests made recently in connection with contemporary research work: "As to case studies, we are willing to state that a series of experiments were run, involving the use of sulfurized lard oil, blended with a suitable paraffin oil. During the course of the experiments, percentages of both lard and sulfur were varied, the viscosity of the paraffin oil used was varied, and the additions of materials of a more or less penetrating nature, such as kerosene and pine oil, were made. Lead base oils were tried, both alone and in combination with sulfur.

"Conditions of operation, both as to mechanical details and method of operating, were carefully checked and an attempt was made to maintain these same conditions so far as possible in each test.

"All of the work was done by two very skilled and carefully observing men, and, as near as could be judged, results obtained in all the tests were entirely comparable. The materials used in these tests were ordinary cold rolled steel, chrome nickel steel, ordinary so-called machine steel and several samples of chrome nickel. The operations performed were ordinary cutting, varying the speeds and feeds over a wide range. Threading and forming operations were conducted varying the speed.



Courtesy Sun Oil Co.

"Our tests as conducted show us very conclusively that sulfur properly combined in an oil is a marked coolant. That additions of lard without question produce a better finish. However corresponding additions of suitable light penetrants produce a better finish than the lard.

"It would seem likely that a distinct penetrating action, such as might be expected from such products, is highly essential for free cutting.

"Lard oil, while possessing a great degree of oiliness, and producing a measurably good finish, does not seem to possess this highly desirable penetrating quality.

"Of course, an immense amount of very careful work remains to be done before even any one manufacturer of lubricating products can definitely specify any given product for any particular job. Sulfur will combine with practically every known fatty material and, for that matter, with almost any known organic molecule. Many of these products will suitably blend or combine with cutting oil bases to give more or less suitable cutting fluids.

"Without doubt fluids even more suited for general use in connection with metal working will be developed, but at the present time the greatest possibilities as to development seem to lie along the lines of experiment with sulfur-bearing materials.

"It is highly essential, however, in dealing with such products, to bear in mind that products must be formulated which will have no injurious effect on the hands of the machine operators, and will have no etching or corrosive action on the metals with which they come in contact."

Through the courtesy of a leading producer of soluble oil who is now working with a line of sulfurized cutting fluids, we are able to show in Table 1 the chemical composition of a group of cutting oils widely used in the automotive field. Each of the seven materials contains sulfur. The oils from 1 to 6 are used for general purposes on all types of machines. No 7 is for broaching and heavy cuts.

Soluble Oils Gaining

Applications of soluble oils have been growing by leaps and bounds and should increase at an accelerated rate as the early inhibitions are overcome. Trouble is that many who were bitten in the early stages of development have been afraid to try again. However, the experience of many large users proves that the market affords a variety of good soluble oils. The acid test to apply to your operation is to make sure that the oil forms a stable emulsion and contains no active corrosive ingredients. These qualities as well as the cutting action may be checked simply and accurately.

Perhaps the most important thing to determine in the utilization of a soluble oil is the proper degree of dilution. The limiting value is a mixture so weak as to cause corrosion of the work or the machine. This also is the critical point for the stability of a poor soluble oil.

There is a moral in the following experience related by a lubrication engineer. Recently he completed an important cutting oil application for a large plant—the bulk of the material being a soluble which was diluted 15 to 1. Everything worked fine at the start, but shortly after he got home a hurry call came in. Everything was wrong. Work was being ruined by rusting. To make a long story short, he investigated and soon found that the trouble was due to a woefully weak mixture. Although the foreman thought the mixture was anything from 6 to 1 to 15 to 1, it was

The following have contributed valuable suggestions and data concerning the discussion in this article:

R. S. Drysdale, Sun Oil Co.
W. H. Oldacre, D. A. Stuart & Co.
W. A. Buechner, E. F. Houghton & Co.
George H. Ryan, The White & Bagley Co.
J. A. Gitzen, Linday-McMillan Co.
G. J. Steigerwald, The Climax Refining Co.
A. B. Hoel, Atlantic Refining Co.

actually about 80 to 1.

Something of this nature may happen in the best of families, and a lot of abuse heaped on perfectly innocent people thereby. Which leads us to suggest the following simple method of testing any water—soluble emulsion or mixture. Take a stoppered glass graduate of a little more than 100 cc. capacity. Take a sample of the mixture right out of the machine and measure off 100 cc. into the graduate. Add about 20 cc. of 1 to 1 sulfuric acid (H_2SO_4). Let the mixture stand for a moment to allow the escape of gases evolved in the attack on fats or fine metal chips. Then cork, and shake vigorously until the break occurs.

The interpretation of results is simple and best illustrated by example. Suppose the volume of oil after the break is 10 cc. That's 10 per cent or 10/100 of the original mixture. The reciprocal of the fraction, 100/10 or 10 to 1, is then the answer. If the oil volume had been 8 cc., the fraction would be 8/100, the reciprocal 100/8 or 12½ to 1.

Now it is possible that some shrinkage may occur due to the attack on the fatty components. This is readily detected by noting the total volume in the graduate after the reaction has taken place. If the volume is less than the total of emulsion and acid, the difference may be attributed to the escape of some material in the form of gas. Usually this loss is negligible and will not affect the result. However a correction can be made if necessary simply by adding the amount of shrinkage to the oil volume.

With the foregoing as a background, we can summarize the situation as follows: Due to a concerted effort on the part of cutting oil producers and many other investigators, there is now available a simple choice of soluble oils and sulfurized materials which are said to fill the requirements of a wide variety of metal cutting operations. Between the production man and the lubrication engineer it should be possible to work out a test procedure that will point to the proper choice of materials and their most economical utilization.

Many men working in this field tell us that the chief bar to the most economical utilization of cutting fluids has been the difficulty of getting the factory to adopt the simple but necessary test procedure they recommend. Which is unfortunate when you consider how important the cutting fluid is in the scheme of things. You may be sure that those who are approaching the problem in the right way are reaping dividends in results.

The inevitable conclusion is that it's mighty good business for every production executive to look into the merits of these new tools for the metal cutting shop. Here is a signal opportunity to simplify, to standardize, to cut down your inventory of many kinds of cutting oils.

Service Complaints Guide Car Engineering Development

In a paper on "Service Complaints as Related to Engineering Tests," read at a joint meeting of several engineering societies in Detroit recently, N. Dreystadt of the Cadillac Motor Car Co. said that purchasers of the more expensive cars often have had extensive previous experience with cars in lower price classes and have formed definite opinions as to what they want in a car. They test their cars on the largest proving grounds, the whole United States, and their experience enables them to make important suggestions and criticisms that often are valuable to the engineering department and the factory. It is one of the functions of the service department to bring the customers' reactions to the product before the engineering and manufacturing departments, and this can best be accomplished by means of an organized reporting system covering all complaints and suggestions of customers and of the distributing and field organizations.

The Cadillac Motor Car Co. insists that a new-car inspection report be sent in by distributors and branches within ten days on all cars received by them. A car-complaint report is furnished the service department on all complaints or suggestions made by the owner, regardless of the mileage or age of the car. These complaints are tabulated, and weekly meetings are held with the department heads of the engineering and manufacturing divisions at which all complaints and suggestions are discussed. Occasionally specimens are submitted to explain and support complaints. These complaints are weighted with respect to danger, expense involved, possibility of further trouble and expense with increase in age of car, and number of complaints.

Sometimes, of course, complaints are misleading, and the following example was cited by the author: About a year ago fifteen complaints about noisy rear axles were received in one week. This was an entirely new complaint and it was therefore carefully investigated. It was found that the trouble was due to improper mounting of special bodies, which latter rested on the rivet heads of a frame cross-member. A change in the method of body mounting remedied the supposed noise in the rear axle.

In our report of the test made on the McCormick TracTractor at the University of Nebraska, in *Automotive Industries* of June 18, the following statement occurred:

"In the variable-load test the fuel consumption varied from 0.57 gal. per hour for an output of 0.70 hp. to 9.92 gal. per hour for an output of 26.29 hp."

This should have read as follows:

"In the variable-load test, 0.57 hp.-hr. was developed per gallon for an output of 0.70 hp., and 9.92 hp.-hr. per gallon for an output of 26.29 hp."

JUST AMONG OURSELVES

Automotive Meetings Paying Big Dividends

"THE end of a convention," says *Advertising Age*, "always recalls the story of the darky who constantly complained because his wife talked so much.

"'What does she talk about?' asked a friend.

"'She don't say.'"

A good yarn and aptly applied, but less true of 1932 automotive conventions than ever before. S. A. E. group down at White Sulphur talked a lot this year—and talked very much to the point. Less time was wasted mentally and physically than in many years. Same thing was true of Chicago session of Motor & Equipment Wholesalers Association late in June.

Generally speaking, automotive conventions and meetings of all kinds are paying bigger dividends per dollar invested than ever before and are creating precedents which might well be followed after prosperity returns. Permanent deflation in convention wastage would be good for us.

Industry Rich Source of Railroad Revenue

NEW YORK CENTRAL LINES collected 15 per cent of all the revenue paid to railroads in 1931 for transporting rail carloads of automobiles, trucks, parts and tires. New York Central revenues from this source totaled $11,529,216, the next largest total having been the Southern Pacific's, which was $3,771,206. Pennsylvania R. R. was third with $3,657,465 and Atcheson, Topeka & Sante Fe fourth with $3,257,974.

These shipments of cars, trucks, parts and tires last year resulted in 410,845 carloads of freight for which the railroads were paid $76,672,315.

Shipments by allied industries caused by automotive consumption brought the total number of carloads which the automotive industry was responsible for originating up to 3,106,645 carloads.

These are just a few of the interesting figures garnered from two pages in the new issue of "Facts and Figures," the annual statistical handbook published by the National Automobile Chamber of Commerce.

Eighteen Months to Pay—Maybe

WE recorded the fact a few weeks back that 18 months time payment paper seemed to be getting more common lately, pointing out that it was being granted more readily than in the past by several important finance companies. That item brought an interesting letter from a man long familiar with the course of events in both the automobile and financing businesses. He thinks the extension of 18 months paper should be discouraged and makes this striking comment:

"I would not hesitate to say that if the proportion of long-time paper gets up to 20 per cent or more, it will be the subject of serious criticism by the bankers of the United States who furnish the money on which finance companies operate, and the effect will be distinctly detrimental to the automobile industry."

1925 Produced Most "Long-Termers"

THE records of the National Association of Finance Companies are of interest in this connection. They show that in 1925 was issued the highest percentage of paper with more than 12 monthly instalments; such paper constituted 18.3 per cent of the total that year. Such paper dropped to 13.2 per cent of the total in 1926 and to 12.4 per cent in 1927. Since that time, however, the percentage has risen steadily, going to 14.5 per cent in 1928; to 14.9 per cent in 1929; to 16.6 per cent in 1930 and to 17.8 per cent in 1931.

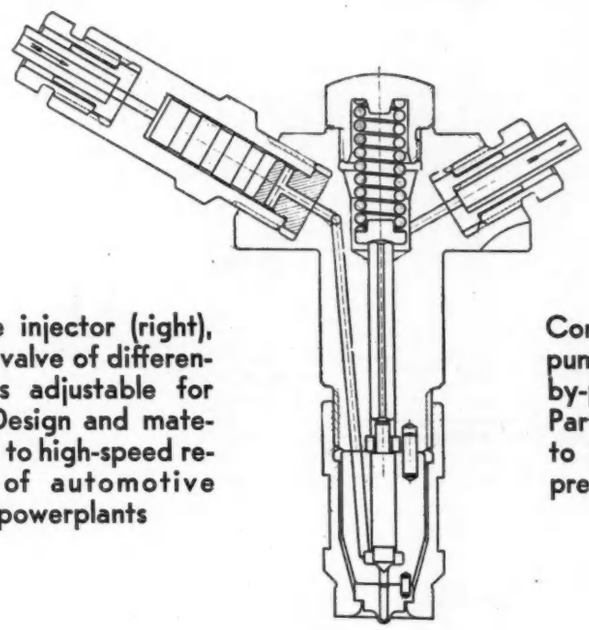
The 1932 figures aren't available yet, but we wouldn't be surprised if another increase—even though a slight one—were recorded this year.

Overseas Parts Sales Rigorously Controlled

IN the United States the parts distributor has always before him a good business from many thousands of well-established independent repair shops, regardless of purchases by car dealers themselves. But in a country like Denmark, according to a correspondent, "nearly all dealers and service stations in the automobile line are either Ford or Chevrolet, authorized and therefore rigorously controlled from either one or the other of these two factories."

Here in America the independent has had all the best of the battle up to the present time and bids fair to continue to do an important share of the business forever. Abroad perhaps the picture is different.—N.G.S.

Improved Compur Injection Pumps and Injectors Available Here



Closed type injector (right), with conical valve of differential type, is adjustable for pressures. Design and material adapted to high-speed requirements of automotive Diesel powerplants

Constant - stroke type fuel pump feed controlled through by-pass valve with set screw. Parts are built of alloy steel to adequately handle high pressure demands made of equipment

by P. M. Heldt

INJECTION equipment for high-speed oil engines has been developed by the firm of Friedrich Deckel of Munich, Germany, which is represented in this country by Nicholas Fodor, 75 West St., New York. The line comprises a range of sizes of injector valves, injection pumps, and governors. Illustrations of one of the injectors and one of the pumps are reproduced herewith.

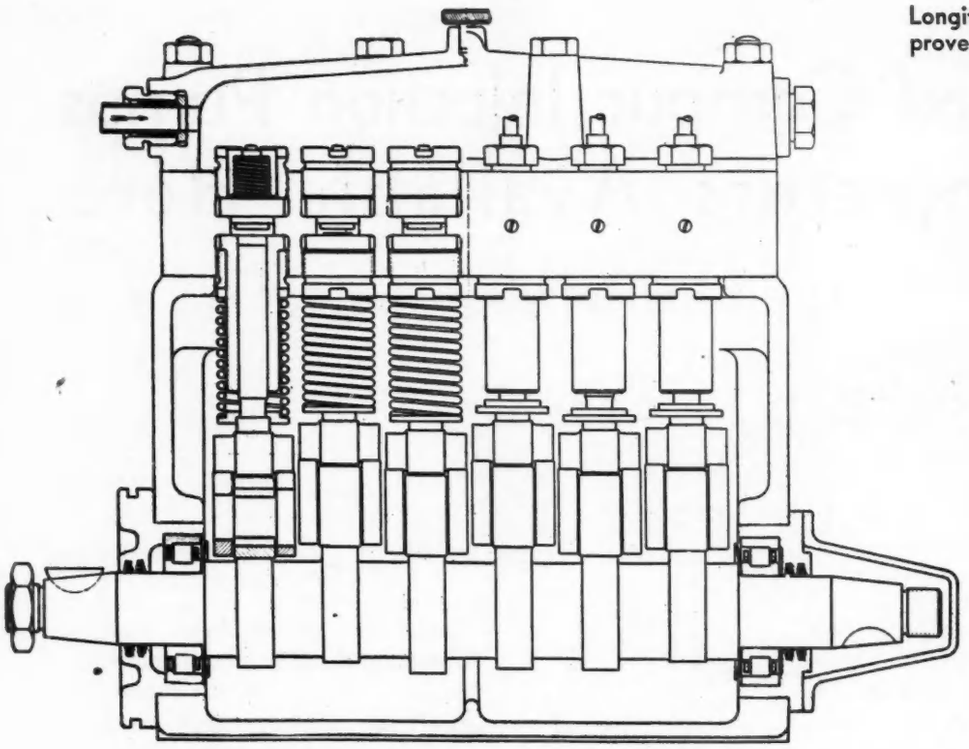
While Compur pumps and injectors have been on the market abroad for a number of years, the illustrations represent the latest designs, of which the first samples were brought to this country only a short time ago.

The Compur injector belongs to the closed type, having a conical valve that is located close to the nozzle tip. This valve is of the differential type, being held to its seat by a spring and opened shortly after the beginning of the delivery stroke of the pump plunger, at the moment when the fuel pressure begins to exceed the spring pressure. The injection pressure can thus be varied by changing the pressure of the valve spring.

To obviate the need for packings, the injector valve is lapped to a close fit in its bushing. By the use of specially suitable materials for the valve and bushing, it has been possible to limit the weight of the valve and other moving parts to one to two ounces, according to size, and thus make it possible for the pump to operate efficiently at the highest speeds used in Diesel engine practice.

The nozzle tip in which the orifices are machined is a separate piece which is secured to the valve-guide bushing by a cap nut which also connects the valve assembly to the nozzle holder. This latter contains the spring and the screw cap by means of which the spring pressure can be adjusted. The faces of the nozzle and valve-guide bushing, as well as the lower face of the valve holder, are ground and lapped to give a perfect fit and to assure oil-tightness without the use of packings. Nozzle tips can be furnished either with a single orifice or multiple orifices, as desired.

The high-pressure connection, which is shown at the left in the illustration, is in this case provided with a fuel filter. At the right is seen the connection for the leakage line, which returns to the fuel tank any fuel that may seep by the nozzle valve. For venting the injector and line (which is necessary only when the line is first connected up) a small hole is drilled through the head of the injector to the bottom of the hole for the high-pressure connector, and to vent the line the high-pressure connection is slightly loosened while the pump unit is being worked by hand. It is possible also to provide a separate screw valve in the injector head, but owing to the rare need for venting,



Longitudinal section through improved Compur Diesel fuel pump for six-cylinder engine

the manufacturer does not recommend it.

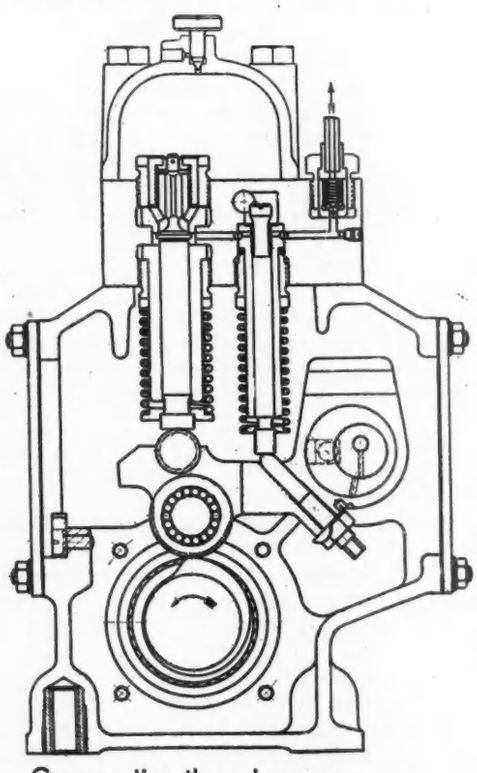
Owing to the fact that the nozzle tip is a separate part, the same injector can be used for engines of a considerable range of sizes, by merely interchanging nozzle tips. As a matter of fact, three different injectors are used to cover the whole range of engines. To assure long life of the injectors, all parts of the assembly are hardened and ground. The complete injector is secured to the cylinder head by either a yoke or a pair of studs and nuts.

Referring to the accompanying sectional views, the Compur fuel injection pump consists of four principal parts, viz., the oil cover with suction line, the pump body complete with plungers and valves, the rocker lever with double-eccentric fulcrum shaft and regulating levers, and the pump casing with camshaft and roller bearings.

All cams are made integral with the camshaft, which is supported in the end walls of the pump casing on roller bearings. The pump plungers as well as the by-pass valves are operated from the camshaft through the intermediary of a rocker lever which actuates both the plunger and the by-pass valve of its particular pump unit. The fulcrum shaft consists of two eccentric shafts of which one surrounds the other.

The pump is of the constant-stroke type, and the amount of fuel injected per stroke is controlled by means of a by-pass valve. As the pump plunger is being raised by the cam, fuel is forced from the pump cylinder through the delivery valve shown at the right in the cross sectional view, passing by the by-pass valve on the way. At the beginning of the upstroke there is a certain clearance between the bottom of the by-pass valve stem and the point of the set-screw by which it is lifted. At a certain point of the stroke this clearance is taken up, and the by-pass valve is then lifted from its seat. Pressure on the fuel is then relieved, the delivery valve closes, and the fuel moved by the pump plunger during the rest of the up-stroke returns through the by-pass valve to the oil chamber on top of the pump, from which the pump draws its supply during the inlet stroke. In one size of the pump the by-passed oil is returned to the fuel tank. A permanent adjustment of the time of opening of the by-pass valve—and thus of the quantity of fuel delivered per stroke—can be made by means of the set screw through which the by-pass valve is lifted. If this is screwed further into the rocker arm, the by-pass valve will lift sooner and the delivery of fuel is decreased, and vice versa. This adjustment is used only for equalization of the deliveries of the various units.

The inner eccentric of the fulcrum shaft serves to



Cross section through pump

vary the time of beginning of fuel injection. It will be noticed that the axis of eccentricity of this eccentric is substantially vertical, and when the eccentric is swung around its axis of support, the roller at the end of the rocking lever will contact with a certain part of the cam earlier or later than previously, according to the direction of rotation, which results in an earlier or a later beginning of the injection. The beginning of injection can thus be varied by 10 deg. of crankshaft rotation.

Closely Matched Explosions

On the other hand, if the outer eccentric is rocked around its axis, the clearance between the by-pass valve and the set screw operating it, at the beginning of the delivery stroke, is increased or decreased, which results in a decrease or an increase in the amount of fuel delivery, respectively. One advantage claimed for the Compur pump is that, since the delivery of each pump unit can be independently adjusted, it is possible to get closely matched explosions in all cylinders. Close equalization of the charges delivered by the different pump units is said to be particularly important in connection with smooth idling of the engine. The fact that both the timing and the delivery of the pump can be varied while the engine is running, is said to make the pump ideally suited for use on variable-speed engines, such as automotive and marine types.

All parts of the pump that are subjected to high-pressure are made of alloy steel. The plunger and its bushing, and the by-pass valve and its guide are all made of steel and hardened and ground to a close fit. The delivery valve and suction valve consist of hardened steel parts exclusively, and both are independent assemblies. All of these parts are assembled into the pump body, which is a one-piece steel forging. By using lapped surfaces for all joints, the need for gaskets is obviated. Since the pump cylinders and valve sleeves are separate parts, held in the pump body by gland nuts, it is possible to replace them in case of wear or injury. The cams on the camshaft are arranged to conform to the firing order of the engine, so there need be no crossing of the fuel lines to the injectors.

High Standards Maintained

The manufacturer states that the greatest care has been exercised in the design of the pump, to assure a high degree of rigidity, so as to reduce deflections under pump pressure to a minimum. The camshaft is mounted on substantial roller bearings and the roller at the end of the rocker lever is mounted on a needle bearing. Spring pressures are such as to prevent the separation of the parts under inertia forces at the highest operating speeds.

When the pump is installed on a governed engine, the governor is connected up to the outer eccentric which governs the quantity of injection. In order to assure sensitiveness of the governor, it is necessary to make it possible to move the parts acted on by the governor with the least effort. To this end the by-pass valve is "balanced," that is, so designed that the fuel presses against surfaces of equal area in both directions, and to open the valve it is necessary only to overcome the pressure of the light valve spring. This makes it possible to use a comparatively compact governor which can be combined with the pump.

When the pump is first connected up to the engine, it is necessary to prime the line, and this can be done by hand. It will be noticed in the cross section that each rocker lever is provided with a lug above its fulcrum, through which is drilled a hole transverse to the fulcrum. By inserting a steel rod into this hole, each pump unit can be operated as a hand pump, and the pump and the whole injection system filled up with fuel.

Compur injection pumps are made in five sizes, and each size of pump comes with five different plunger diameters; thus 25 different capacities ranging all the way from 60 cu. mm. to more than 6000 cu. mm. per stroke are available.

Compares Gasoline and Diesel Fuel Prices

THE subject of the price relation between gasoline and Diesel fuel (gas oil) is discussed as follows by Ernst W. Steinitz in a recent issue of *Automobiltechnische Zeitschrift:*

"The production of gas oil always costs considerably less than that of gasoline, for the following reasons: Gasoline, in the first place, must be carefully blended of a number of different distillates, viz.: straight-run gasoline, cracked gasoline, and the very volatile casinghead gasoline, in order to obtain the desirable boiling properties (boiling points ranging in practically all parts of the world between 95 and 410 deg. Fahr.). In addition, when preparing the blend, account must be taken of its anti-knock quality, which is now internationally expressed in octane numbers. Finally, it is necessary to refine the gasoline with sulfuric acid, to neutralize it with alkalies, and to wash it with water. Even the purchase of the materials required for the refining process is a heavy burden on the producer.

"In the production of gas oil all of these processes are eliminated, since gas oil practically always can be distilled directly from the crude oil and have the desired properties. In some cases it is necessary to let the fuel clear by allowing it to stand for a while, or to filter it. As regards boiling temperatures and sulfur content, the Diesel engine and other gas-oil-consuming devices are quite insensitive. In the United States attention has been called to a development which, in the long run, may have an unfavorable effect on the gas oil market. American gas companies, as indicated by the name of the product, have been using it on a large scale for the production of illuminating gas, since, at current prices, it is more economical than coal, but as a result of the use of natural gas many of the big gas plants have discontinued operations, and the development is still continuing."

In England, where a considerable number of motor buses and about 500 motor trucks are equipped with Diesel engines, the average reduction in fuel consumption, as compared with gasoline, on the gallon basis, is figured at 30 per cent, and the saving in fuel costs at 80 per cent. The Diesel fuel gas oil costs only 3.25 pence per Imp. gal., as compared with 15 pence per gal. for gasoline (of which 8 pence represents tax). Gas oil is tax-free at present in Great Britain.

New Aircraft-Engine Airworthiness R

A tentative draft of airworthiness requirements for engines has been issued by the Aeronautics Branch of the Department of Commerce and is reprinted below. The new requirements are intended to go into effect on Jan. 1, 1933

Section 1. General

Aircraft, except certain light aircraft as defined in section 2 (B) of Aeronautics Bulletin No. 7-A, and except free balloons, in order to be rated as airworthy shall be equipped with power plants that are approved by the Secretary of Commerce. Light airplanes which do not require power plants of an approved type shall be equipped with power plants that have been assigned a calibration rating.

The requirements contained herein apply to the conventional internal-combustion engine in which the fuel is gasoline or a blend of gasoline with some equally volatile liquid. Special rulings for other types of power plant will be made as the occasion develops.

Commercial engines submitted for approval and which require endurance or rating tests will be tested by the Aeronautics Branch, Department of Commerce. Military engines which have passed the regular endurance tests of and are approved by the United States Army Air Corps or the Bureau of Aeronautics, Navy Department, may be approved in accordance with section 4 below. Engines for which the Secretary of Commerce is requested to assign a calibration rating shall be tested by the Aeronautics Branch, Department of Commerce, or the rating may be based upon tests made by the engine manufacturer, the Army, or Navy.

Engines which comply with the requirements herein outlined to the satisfaction of the Secretary of Commerce may be approved for use in licensed aircraft or assigned a calibration rating for use in certain light aircraft as defined in section 2 (B) of Aeronautics Bulletin No. 7-A. Approved engines may be granted an approved type certificate at the option of the manufacturer, provided the manufacturing facilities for producing engines of an exact similarity in quantities are satisfactory to the Secretary of Commerce.

When an approved type certificate is granted, one set of drawings is impressed with the seal of the Department of Commerce and is returned to the manufacturer to be used in the construction of his engines. The other set is placed in the department's files. The department's inspectors may call for, and must have access to, these approved drawings when making an inspection at the manufacturer's plant to determine whether the engines as built conform to the approved data. Any deviations from the approved drawings must first be approved by the Secretary of Commerce.

If a manufacturer desires the approval of the Secretary for changes to an approved engine the manufacturer shall submit sufficient technical data, including certified reports of tests where necessary, to demonstrate to the satisfaction of the Secretary that the changed engine is airworthy. When the changes to the engine are such as to affect the rating, application for approval shall be made in accordance with section 5 below.

An approved type certificate will be issued under the condition that on January 1 and July 1 of each year the manufacturer will file his affidavit with the Secretary of Commerce showing the number and serial numbers of the engines constructed under the approved type certificate during the half year, with a statement that no engine is being constructed under the approved type certificate deviating from the terms thereof.

Technical data furnished by a manufacturer for approval will be treated as confidential.

Sec. 2. Design Requirements

Engines of 40 hp. or more shall be equipped with dual ignition systems, having at least two spark plugs per cylinder, and shall be so designed that some type of starter can be fitted. Although not required, these features are preferable on engines of less than 40 hp. All engines and engine accessories shall be designed and constructed so as to reduce to a minimum the chances of failure to function in the air and, in so far as is possible, to prevent fires during flight or in the event of a crash. Suitable provision also shall be made in the design of the engine to allow the installation of an air intake heater at the option of the user unless the equivalent is provided.

Sec. 3. Commercial Engines

(A) *Data required.*—In the case of engines which have not been previously approved by the Army or Navy, and for which the manufacturer desires the approval of the Secretary of Commerce, the following information shall be submitted to the Secretary.

(1) Application for approved type certificate, in duplicate, submitted on forms which will be furnished for the purpose by the Secretary.

(2) A complete log, accompanied by an affidavit, covering a manufacturer's block test of an engine of the type for which approval is desired. This test shall be of at least 50 hours' duration and shall be run with

Requirements are Proposed

the throttle wide open, the speed being at least equal to the proposed rated speed.

(3) A complete report of the manufacturer's preliminary test run of the engine that is to be submitted for block test. This test shall be of at least 25 hours' duration and shall be run at an engine speed of not less than 90 per cent of that for which a rating is desired. Ten hours of this test shall be run at full throttle at the rated speed. This preliminary test need not be made if the same engine as that used for the manufacturer's block test is to be submitted for test.

(4) A complete set of drawings descriptive of the engine, in duplicate. Drawings of small standard commercial parts need not be submitted, but all other drawings applying to the engine including those of the assembly and installation shall be included. The material shall be specified on the drawings by reference to a specification number of the Army, Navy, S. A. E., or other such recognized standard wherever possible. If the manufacturer refers to his own specification numbers, details of those specifications shall be furnished the Secretary. All drawings should be folded to a size approximately 9 x 12 in., with the title showing.

(5) A list, in duplicate, of the drawings submitted, giving the number and title of each drawing, preferably arranged numerically.

(6) A detailed report, supported by affidavit, of a 10-hour flight test of the engine. This test shall include a climb at full throttle to the service ceiling of the airplane which should be loaded at its normal gross weight. The report shall completely describe the test and the results thereof and shall include names of persons involved, dates, and particulars of the airplane. The engine used for this test may be the same engine as that submitted for block test or another engine of the same type.

(B) *Tests required.*—The Secretary of Commerce will assign a test date for the engine at the engine testing laboratory of the Aeronautics Branch, Department of Commerce, upon receipt of satisfactory data in accordance with paragraphs (A) 1, 2, 3, 4, and 5 above.

A 50-hour endurance block test shall be run in the department's laboratory in ten 5-hour periods. During the entire test the engine shall be run with the throttle wide open, the speed being approximately equal to the rated speed specified by the manufacturer. The power rating of the engine will be based upon the average observed horsepower developed during the test, corrected for pressure, temperature, and humidity. This corrected horsepower is the power which the engine would develop at a barometric pressure of 760 mm. Hg, carburetor air temperature of 15 deg. C., and a humidity (water vapor pressure) of 10 mm. Hg. Dependence upon excessive fuel and oil consumption for proper cooling during the test will be considered a cause for rejection.

During the test not more than three forced stops shall be allowed. A run of two hours will be added to any period in which a forced stop is made. If the speed during a propeller-load run drops to less than 97 per cent of the proposed rated speed or the power in a dynamometer run drops as much as 10 per cent, due allowance being made for atmospheric conditions, this shall constitute a forced stop. Excessive water, fuel, or oil leaks developing at the engine shall constitute forced stops. In all cases, the Secretary of Commerce shall be the judge as to what constitutes a forced stop.

Minor repairs and replacements may be made between test periods if suitable tools and parts are available, but the test schedule shall not be delayed on this account. The failure of a major part of the engine shall terminate the test.

The manufacturer shall provide a sufficient quantity of fuel and oil for use during the block tests. The grade of fuel supplied should represent the lowest grade which he recommends for use in the engine and the engine will be certified only for use with fuels of this grade or better.

On the completion of the 50-hour endurance test the necessary runs will be made to obtain a curve of power against speed by varying the load with the throttle wide open. Readings will be made at speeds ranging from 75 per cent of the rated speed to approximately 110 per cent of the rated speed. Each speed will be maintained for at least five minutes before a reading is taken. In addition, a high speed test of one-half hour duration will be made at a speed at least 5 per cent in excess of the rated speed.

(C) *Inspection.*—After completion of the block tests a complete tear-down and detailed inspection of engine parts shall be made, particular attention being paid to excessive wear or signs of failure. As result of the inspection, the secretary may require such revisions in parts and additional tests as necessary to establish the airworthiness of the engine, or may reject the engine and require its resubmission, notwithstanding the completion of the tests described in paragraph (B) above.

(D) *Optional tests.*—The following tests may be made at the option of the secretary:

(1) A tear-down inspection of the engine may be made prior to the 50-hour endurance test.

(2) The performance of the engine on various

Approved type certificate requirements set by Department of Commerce are now being revised to further decrease flight hazards accountable to faulty design and construction

grades of fuel, other than that supplied by the manufacturer and used during the endurance test, may be determined.

(3) After the engine has successfully passed the required block tests, a bench test of the carburetor may be made to determine whether the carburetor will continue to supply a satisfactory mixture when it is tilted at various angles.

(E) *Geared engines.*—The tests required for geared engines are the same as those for direct drive engines. Unless the horsepower loss due to reduction gears is excessive, geared engines may, at the option of the engine manufacturer, retain the same rating as a previously approved direct-drive engine.

(F) *Supercharged engines.*—In addition to the data and tests in accordance with paragraphs (A), (B), (C), and (D) above, the secretary may require such technical data and tests as are necessary to determine the airworthiness, rating, and altitude performance of supercharged engines.

Sec. 4. Military Engines

Data required.—In the case of engines which have previously been approved by the Army or Navy and for which the manufacturer desires Department of Commerce approval, the following data shall be submitted to the Secretary of Commerce:

(1) Applications as described in Section 3, Paragraph (A) 1.

(2) A copy of the official Army or Navy endurance test report which was the basis of the military approval, signed by the Army or Navy representative who witnessed the test.

(3) Drawings as described in Section 3, Paragraph (A) 4.

(4) A drawing list as described in Section 3, Paragraph (A) 5.

(5) A report of a flight test as described in Paragraph (A) 6.

Sec. 5. Modified Engines

(A) *Data required.*—In a case where a manufacturer desires the approval of the secretary for an engine which is a modification with a change in rating from a previously approved engine, the following information shall be submitted to the secretary.

(1) If the modification is of sufficient extent to require endurance tests, the same data shall be submitted as outlined in Section 3 or 4 except for drawings and drawing lists, which shall be in accordance with Paragraph (3) below.

(2) If the modification is a minor modification to the approved engine, and technical data are submitted to the secretary which demonstrate that the airworthiness of the modified engine is equal to that of the approved engine, applications for approved type certificate, in duplicate, shall be submitted together with drawings and drawing lists in accordance with Paragraph (3) below.

(3) A manufacturer's request for approval of an engine in accordance with Paragraphs (1) and (2) above shall include drawings covering only the modified portions of the previously approved engine. Two drawing lists shall be submitted. The first list shall include all of the new drawings submitted and the second list shall include unchanged approved drawings that apply from the previously approved engine. If most of the drawings of a previously approved engine apply to the modified engine, the second list may consist of a list of the drawings that do not apply with a statement to the effect that all other drawings of the previously approved engine apply without change. It is recommended that this system of drawings and drawing lists be adopted by the manufacturer of a new engine which is constructed from a number of previously approved drawings from his other approved engine files in order to avoid submitting duplicates of those drawings.

(B) *Tests required.*—Upon receipt of satisfactory data in accordance with Paragraph (A) (1) above, the Secretary of Commerce will assign a date for block tests of the engine at the Aeronautics Branch, Department of Commerce, in accordance with Section 3 if the modification is not one that has been approved by the Army or Navy.

Upon receipt of satisfactory data in accordance with Paragraph (A) (2) above, the Secretary of Commerce will assign a date for a five-hour full-throttle test at the Aeronautics Branch, Department of Commerce, to determine the rating of the engine, unless this rating can be satisfactorily determined by the secretary from a report of tests conducted by manufacturer, the Army, or the Navy, such report to be submitted by the manufacturer. A manufacturer's test report shall include all pertinent details and shall be supported by affidavit.

Sec. 6. Calibrated Engines

(A) *Data required.*—In the case of engines which are to be installed on certain light aircraft as defined in Section 2 (B), Aeronautics Bulletin 7-A and for which the manufacturer desires the Secretary of Commerce to assign a calibration rating only, the data submitted shall include the following:

(1) An application for calibration, submitted on the same form as is furnished by the secretary to applicants for approved type certificate. When used for this purpose the form shall be altered by the applicant by crossing out the words "approved type certificate" in the heading and substituting the word "calibration."

(2) One set of general assembly drawings, sufficiently well dimensioned to show the general specifications of the engine.

(B) *Tests required.*—The calibration rating may be obtained from tests made by the engine manufacturer, the Army, Navy, or Department of Commerce. A calibration test shall consist of a five-hour run on a test stand with the throttle wide open, and the speed equal to the speed at which a rating is desired. When the calibration test is made by the manufacturer the request for rating shall be accompanied by a complete report of the test, supported by affidavit.

Sec. 7. Engine Accessories

Engines will be tested and approved as a complete powerplant with all engine accessories that are attached to the engine and essential for the proper operation of the engine in the air. Cowling, exhaust manifolding, and mufflers need not be included, as these items are subject to inspection and approval in each type installation on licensed aircraft. Propellers, propeller hubs, and propeller blades are also subject to separate approval under the requirements outlined in Chapter 2 of this bulletin.

At the time of the block tests the secretary will make such tests as are necessary to determine the airworthiness of the engine with the attached accessories. It is recommended that the manufacturer submit, at the time of the block test, such optional accessories as

(Turn to page 57, please)

PRODUCTION LINES

Free Air

Tire inflation by a most ingenious method attracted our attention recently. It is fully automatic, rapid, labor-saving. The machine is a six-sided merry-go-round with a vertical air reservoir in the center. Air under pressure is piped to a circular manifold feeding each of the six stations. The operation is very simple. Two men work the machine. One sets the wheel and tire assembly in place, attaches the air hose and repeats the cycle. The other removes the wheel when it reaches his station. During the single revolution of the machine, the tire has been inflated to the right pressure.

New Photoelectric Relay

A general purpose photoelectric relay has been developed by General Electric to provide more sensitive control than the early models. At the same time it permits operation at a minimum light intensity of three foot-candles as against ten foot-candles. The relay uses a Pliotron tube specially designed for industrial purposes. The newer refinements are expected to afford an even wider range of industrial applications.

Heads Off

Soviet has found it necessary to employ an unusual management scheme to cope with present production problems. According to an AP dispatch, they are having difficulty in getting parts for the Stalin truck plant. So the steel mills and parts makers have been warned. Unless they come through quickly, each plant manager will be held personally responsible. And subject to drastic disciplinary action.

Production Men

This is your page.

Any suggestions you have on new methods or kinks may be of value to men in other factories.

If you are working on some new development, we'd like to know about it—even if not for publication with your company's name.

Hard to Shave

Rustless steel is a tough one to punch and stamp. But it has been thoroughly licked recently by several organizations. One secret is the use of greater draw-ring pressure. Which also demands a press with about three times the usual power. Another requirement is greater clearances between die and punch. This will need individual study.

Arc-Proof

According to *The Durez Molder* for July, General Plastics has developed a new arc-resisting material known as Number 41. On comparative tests against standard material, it stands up two hours or longer, whereas the standard material forms a path for the current in thirty seconds.

Furthermore, it molds under ordinary conditions, giving nearly the same production as standard material. Comes from the mold hard and completely cured with a smooth, glossy finish.

Many Happy Returns

Understand that the house of Ryerson will celebrate its 90th birthday on Nov. 1 this year. This organization whose activities are so bound up with those of the automotive industry started in Chicago very, very modestly in 1842. Look at it now. Here's many returns to Joseph T. Ryerson & Son.

Whither Away

You are invited to the second annual conference on the management problems of the smaller industries. Place: Silver Bay, N. Y. Time: July 11 to 15 inc. There's a treat in store in the papers on budgeting, wage problems, marketing, industrial stabilization.

Body Hardware

One of the largest producers of truck body hardware has just displayed his wares between the covers of a good-looking catalog. If you buy or specify hardware you'll find it a big help. A. L. Hansen Mfg. Co. will be glad to send you a copy.

Good Work

Perhaps the most ambitious issue of *Oxy-Acetylene Tips* we have seen recently is the one for July. Most of the contents is devoted to automotive repair operations which lend themselves economically to gas welding. One of the most interesting features of it is a long table listing various parts under unit headings, giving the usual metal composition and the recommended welding method. Certainly ought to make a hit with service stations and repair shops.—J.G.

MANUFACTURING MANAGEMENT METALLURGY

Saves 1.65c. per Mile With Diesel Fuel

Report of automotive Diesel operation, including added maintenance charges, made by Britishers of Berlin transportation corporation

AN analysis of the relative operating costs of gasoline and oil engines in bus service was made in a recent British paper on "Oil Engines in Passenger Transport," by Dr. H. F. Haworth and P. E. Biggar. The conclusions arrived at are summarized as follows (conversions having been made to U. S. currency on the basis of $3.70 per £):

1. The chief and immediate advantage of the oil engine lies in the fact that the cost of its fuel today is very much less than that of gasoline, the relative prices, including tax, being:

Gasoline, per U. S. gallon .... 13.8 cents
Oil fuel, per U. S. gallon ..... 4.8 cents .... (1)

Adjusting these prices to an economic basis, and taking an equal rate of taxation, we have:

Gasoline, per gallon ..... 15.7 cents
Oil fuel, per gallon ..... 15.1 cents .... (2)

2. The inherent and, in the long run, the chief economic advantage of the oil engine is its excellent fuel economy. In an average double-deck bus service:

Gasoline-engine bus . 4.17 m.p.U.S. gallon
Oil-engine bus ..... 7.30 m.p.U.S. gallon .... (3)

3. Other advantages, such as reduced fire risks, rapid starting, lack of exhaust-fume danger, etc., have little or no economic importance.

Combining (1) and (2) we have:

Gasoline-engined bus, per bus-mile	3.3 cents
Oil-engined bus, per bus-mile	0.66 cents
	2.64 cents .... (4)

Combining (2) and (3) we have:

Gasoline-engined bus, per bus-mile	3.77 cents
Oil-engined bus, per bus-mile	2.07 cents
	1.70 cents .... (5)

Thus, with fuel prices adjusted to practically the same level, the oil engine still shows a substantial saving on fuel costs.

4. For various reasons, maintenance cost of the oil engine must be charged at a higher rate, as follows:

Gasoline maintenance, per bus mile	0.385 cent
Oil-engined bus, per bus-mile	0.57 cent .... (6)

On account of its higher first cost the oil engine must be depreciated at a higher rate, as follows:

Gasoline depreciation, per bus-mile	0.554 cent
Oil-engine depreciation	0.94 cent

5. On account of its increased weight the use of an oil engine means, in double-deck bus service, the loss of one seat, valued at approximately 0.31 cent per bus-mile. As this is a special charge and applies only to this service, no deduction has been made.

6. The various shortcomings of the oil engine, on the grounds of smoke, smell, roughness, noise and vibration, while of considerable interest technically, have no economic importance.

Combining (6) and (7) we have:

Gasoline maintenance and depreciation	0.939 cent
Oil-engine maintenance and depreciation	1.51 cent .... (8)

Combining (4) and (8) we have, at present fuel costs:

Saving on oil engine ... 2.08 cents per bus-mile

Combining (5) and (8) we have, at adjusted fuel costs:

Saving on oil engine ... 1.12 cents per bus-mile

Taking all factors into account there is therefore a substantial saving in favor of the oil engine, although the figure is about 1.5 cents less than that usually quoted.

The authors also furnish some figures pertaining to actual oil engine use in transportation in various centers. Fuel costs are 13.8 cents per U. S. gallon for gasoline, and 4.8 cents per gallon of fuel oil in London; 19 cents for gasoline and 8 cents for fuel oil in Berlin, and 8.36 cents for gasoline and 7.07 cents for fuel oil in Detroit, both of these latter figures including a 2-cents-a-gallon tax.

At the present time some 3900 Diesel-engined trucks are said to be in service, distributed as follows: British Isles, 500; Germany, 1700; France, 1200; remainder of Continent, 250; elsewhere, 250; also about 470 Diesel-engined buses, distributed as follows: British Isles, 300; Germany, 40; France, 30; remainder of the Continent, 80; elsewhere, 20. The greatest number of Diesel-engined buses in service in any one city is 44, in Vilna, Poland; London follows with 32 and Manchester with 30.

Following is a summary of the complete running costs of gasoline and Diesel-engined buses in Berlin, furnished the authors by the director of the Berliner Verkehrs A.G.

Cost of fuel, gasoline bus	4.21	cents per mile
	1.34	
Cost of fuel, oil bus	1.34	cents per mile
	2.87	
Additional maintenance cost	0.60	
	2.27	
Additional depreciation	0.62	
Net saving on oil engine	1.65	cents per mile

European Use of Light Alloys Gains

Reports Show Interesting Uses of Duralumin in Building Truck Bodies for Increasing Pay Loads

IT appears that the development in the line of commercial vehicle bodies of light alloys which has been going on in this country during the past two or three years has been paralleled in Europe to a certain extent.

The Societe de Transports Automobiles had a truck body built entirely of duralumin. It comprises a framework built up of rings or arches, from the upper portions of which are suspended the meat carcasses for the transportation of which the truck is used. Since the load is suspended from the roof as it were, special provisions had to be made to take care of the centrifugal forces and forces of acceleration and deceleration. These latter forces are taken care of by running diagonal braces through the sides of the body. The rings or arches are of such design that all parts are substantially equally stressed.

This meat truck is provided with wheels of Alpax (an aluminum-silicon alloy) which with their steel centers weigh 99 lb., as compared with 143 lb. for steel wheels. They are 24/8-in. wheels and are adapted to take 42/9-in. tires, and they are interchangeable with Michelin steel disk wheels. If made of magnesium, these wheels weigh only 77 lb. The two rear-swinging doors are cast of Alpax and weigh only 48 lb., instead of 84 lb. if made of composite construction (wood framework with sheet-steel covering). The truck carries two large fuel tanks made of duralumin, one of which is mounted on each side.

Alfol is used as a heat-insulating material for the body of this refrigerator truck. It consists of crumbled aluminum foil of very light gage, the weight of this material being only 0.188 lb. per cu. ft., as compared with 9.3 lb. for cork. It is said to have approximately the same insulating power as cork for the same thickness.

In Germany there are in service more than 3000 motor buses with bodies built largely of light alloys. Some of these buses have been in operation for five years. In the case of certain 28-seaters, the weight saving through the use of light alloy buses amounted to as much as 1540 lb. Other buses are in service by the Post Office Department. Finally, there are double-deck 60-seaters in which the entire superstructure is of light alloys, which in this case permits of a saving in weight of 3300 lb. The six-wheeled omnibuses of the Post Office Department sometimes are operated in the unpainted condition.

The Fire Department of Frankfort-on-Main had two pieces of fire equipment built in which light alloys were extensively used. A fire engine of a design which weighed 14,550 lb. when built of steel, weighed 9000 lb. when built of aluminum, thus permitting of a saving of 5550 lb. A ladder wagon which when built of steel weighed 17,100 lb., weighed 11,150 lb. when built of aluminum, a reduction of 5950 lb. On a moving van a saving of 4400 lb. was effected.

Finally, numerous wheels of Alpax (aluminum-silicon alloy) have been in service for more than five years. The weights of these wheels compare as follows with those of steel wheels:

Wheels for solid-rubber tires	Steel (lb.)	Alpax (lb.)	Reduction Per Cent
38 x 7	106	59	44
34 x 7	86	40	54
40 x 5	53	31	42

In Switzerland the Post Office Department has been using 17-passenger buses with a certain amount of aluminum in the bodies since 1917. The new 14-passenger buses weigh only 3085 lb., instead of 5370 lb. if they were made of steel, a saving of 40 per cent (this probably applies to the bodies only). Seitz & Co. of Kreuzlingen, near Neufchatel, manufacture light metal bodies with seats for 18 which weigh only 2640 lb., instead of 3740 to 3960 lb. if they were made of composite wood and steel construction. The same firm's 32-passenger body weighs 5500 lb., as compared with 8800 lb.

The buses of the London General Omnibus Co. make extensive use of the light alloys. For instance, in the case of a single-decker it was possible to reduce the weight by 1233 lb. from 3815 lb.

The Duramin Engineering Co., Ltd. of London uses light alloys exclusively for the construction of commercial vehicle bodies, the frame and floor being of duralumin and the paneling and wheel housings of aluminum. Characteristic data of some of these bodies are given below:

Truck for the transportation of cattle or of meat quarters, insulated with "alfol." Useful load, 13,500 lb.; weight of body, 3370 lb.

Milk transport truck. Useful load, 20,000 lb.; weight of body, 2340 lb.; weight of driver's cab, 282 lb.

Truck for the transportation of carcasses of meat suspended from the roof. Useful load, 22,400 lb.; weight of body, 3370 lb. Amount of weight saved by the use of light metal construction, as compared with composite steel and wood construction, 8170 lb. Insulation, 3 in. of "alfol."

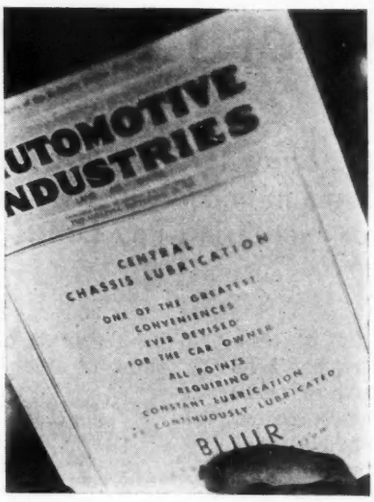
Six-ton trailer. Weight of steel-wood body, 3950 lb.; weight of light alloy body, 1680 lb.; reduction of weight, 2750 lb.

Dump truck body of 4-ton capacity. Dimensions: 14.75 ft. by 7.22 by 6.27 ft.; weight, 1343 lb.; weight saving, 1650 lb.

Body for the transportation of stone, capable of swiveling in three directions. Weight of duralumin body (¼-in. sheet), 1585 lb.; weight of wooden body, 4400 lb.; capacity of body, 18,000 lb.

Tank body for the transportation of liquids (gasoline, oil, milk). Four-compartment tank of 1720-gal. capacity; weight, 1570 lb.; saving in weight, 1760 lb. Six-compartment tank of 3575-gal. capacity, with a separate detachable tank of 600-gal capacity at the rear. All accessories are of light alloy. Cost less than a vitrified steel tank and is lighter.

". . . D. G. Roos hit nail on the head . . . such discussions will make next year's race most valuable to public and engineers."



". . . Louis Chevrolet, Tommie Milton, Joe Dawson . . . to judge whether driver is capable of handling his car at Indianapolis . . . "

The Forum

Congratulates Stock Cars For Indianapolis Showing

EDITOR, *Automotive Industries:*

With a great deal of interest I have read Barney Roos' splendid article in the June 11 issue of *Automotive Industries* and his four points certainly hit the nail on the head, although I do not quite agree with his last point.

I believe considerable discussion on this subject would make next year's race the most valuable that was ever conducted, both to the public and the technical side of the industry.

Barney Roos refers to the peculiar conditions at the Indianapolis Speedway. I suppose I know that track about as well as anyone, as I worked and slept on it for years. I wonder if it is realized that that Speedway was originally built for a maximum speed of around 90 miles an hour and here the drivers are attaining speeds of 25 miles an hour beyond that at times, due naturally to the fact that the track has stood still, of course, while technical advancement has progressed.

Success Requires Experience

But the beauty lies in the fact that this accidental condition has created the speedway into a practical road-race, and makes it probably the greatest practical test of motor car engineering in the world. Definite knowledge of the requirements of the conditions of the speedway is absolutely necessary to success. The best illustration of this is that the best drivers in the world who come there with new cars, without former experience and without the advice of men who know the requirements of the speedway, are doomed to failure on this course.

At a meeting held just prior to the race this year by the drivers and the members of the Indianapolis section of the Society of Automotive Engineers, practically every one of the points was discussed, and I believe it is a fair statement to say that the majority of them felt that limiting the oil and fuel would be one of the greatest factors in limiting speed that could be devised.

I question the increase in the length of the race. It is a hard, grueling race as it is and it is a highly specialized race. If a longer race was needed, let me suggest a 24-hour real stock car race around Labor Day. I believe if you had 40 experienced drivers, with reasonably good cars, there is no danger from the early congestion, but I believe that regardless of the qualifying speed, certain cars should be barred from the speedway.

Suggests Board of Ex-Drivers

For instance, cars that have improperly designed axles, or cars that are known to be old and ready to fall apart. Cars that would endanger the success of other contestants should be barred arbitrarily. I believe that a committee of ex-drivers should be appointed to carefully note the performance and handling of a car by a driver immediately preceding and during qualifying, to judge whether he is really capable of handling his car on the track. I would suggest a group such as Louis Chevrolet, Tommie Milton and Joe Dawson.

I rather feel that the displacement-weight ratio should be materially changed. I do not believe that the men who incorporated this rule ever intended that. What they r e a l l y wanted was a power-weight ratio and there is a lot of difference between displacement-weight ratio and power-weight rate ratio. As an illustration, there is very little doubt that the 183 cu. in. Miller cars this year, developed considerably more power than the 300-odd cubic inch Hupmobile; yet Russell Snowberger was compelled to endanger his life and those of the other contestants by carrying some 300-odd pounds of lead on his car to compensate for the greater displacement of it, and that 300-odd pounds of lead was an almost insuperable handicap. The result of the first test that he made after he put this lead on was to burst tires at speeds that he could easily handle without this additional weight. I cannot believe the framers of the rule intended such a thing to occur.

Of course, limiting the fuel will go a long way towards accomplishing this, regardless of weight. Then, open the race to honestly designed stock cars. If they have six valves per cylinder and they are actually building them in production, let them come in. Let us determine whether there is anything of value in this.

Modification for Speed Spurts

If you have a gasoline limit that is reasonable, and I am assuming the framers of the rule would make it reasonable, put a minimum speed of say 95 miles an hour, if you please, that the winner must attain, but make the rule so safe that that can easily be attained. Then I make one more suggestion. If you want wild speed, in addition to the lap prizes, put a prize of $5,000 up for the leader at 250 miles, regardless of his gas consumption. Then if some driver went out and made a great show and attained tremendous speed for half of the race, he would be compensated for it. He would get considerable publicity, and you would be in the position of having two races in one, and I believe the crowd would have the thrill of their lives.

Accurate Gages a Factor

I fully appreciate that you cannot divorce the crowd and the show from the technical side, but it seems to me that after all is said and done, the more uncertainty, right up to the last lap, the greater the thrill and excitement of the crowd, and what could be more fascinating than the very uncertainty of someone leading in the last 50 miles, with no one, including the driver, knowing whether he had gas enough to finish? For the first time, accurate gasoline gages would be a real factor. Gas and oil lines would

be carefully protected as never before, pistons and piston ring designs would certainly advance, and, automatically, some of the complaints about big piston clearance would be answered.

A year is none too soon to begin thinking of the race, and I believe that the quicker the rules committee act on this, the better it will be for everybody.

More power to Barney Roos, and more power to the other factories coming in!

I believe the performance of Barney's cars this year was one of the most remarkable things I have ever seen. Under the conditions, the performance of Russell Snowberger's Hupmobile was nothing short of marvelous. The designers of those wonderful Hudsons deserve a lot of credit. It seems to me that every manufacturer who had a car in the race covered himself with glory.

Very sincerely yours,
F. E. MOSKOVICS.

Suggests Race Rule Formula

Editor, AUTOMOTIVE INDUSTRIES:

Referring to D. G. Roos' proposed change* in the Indianapolis Speedway rules are in the right direction but I think it would work out better for the development of the future car and truck if he would consider weight in the problem.

When they were using the supercharger the race was won by figuring speed only. Pumping unlimited quantities of fuel through the motor and not accounting for it is wrong.

If the race is to be useful in the future in engineering as well as sport, they should be forced to work for economy, which is the main thing to strive for in engineering.

Mr. Roos would limit all cars to the same amount of fuel for the 500 miles. What would that amount to? All small cars and cut out the heavy ones. It takes more fuel to pull a 10-ton truck over a given road than it does a 1-ton truck at 40 m.p.h.

I would suggest allowing fuel to each car in proportion to its weight and give a penalty if they use more and a credit if they use less in proportion to the amount. Split the prizes up if necessary, half for miles per hour and half for economy on fuel and oil.

Speed plus fuel and oil economy of moving a given weight a given distance would win the race.

E. E. GARNER.

* "Let Engineering Rule the Roars at Indianapolis Speedway Classic," page 839, June 11, 1932, *Automotive Industries.*

World Morass Was Caused by Moral Let-down, Tipper Says in "Challenge of Distribution"

"The New Challenge of Distribution," by Harry Tipper, Harper & Brothers.

Reviewed by Norman G. Shidle

"Dislocation of the world's entire distribution system is due to human departure from the principles of justice. The cause of present world troubles is fundamentally *moral.*"

Using this thesis as his broad fundamental, Mr. Tipper probes deep into the principles and processes of modern distribution necessities, lays out the various factors in clear relationship to one another and comes to the conclusion that better planning of the distributive process and higher moral leadership by those in command of industry offer the only possible means of even gradual improvement.

Until recently general sales manager of General Motors Export Corp., and with several previous books on marketing and advertising to his credit during the last 20 years, this author writes with both practical and theoretical knowledge of the questions which he discusses.

Philosophical rather than economic in its conception, this book will disappoint the hard-pressed sales manager seeking immediate panaceas for declining sales curves. It should delight those few analytical industrialists who have the time and inclination to worry about where the peoples and properties which they control may be heading 10 years hence.

In it we find portrayed the competitive struggle between basic and nonbasic industries; the reasons why nationalism as such is an economic nuisance; the destructive phases of the competition between producers and consumers and the interesting speculation that Russia's real problem will arise only when its productive facilities have once caught up with the needs of its people and its real task becomes that of distribution.

The objective of distribution, Mr. Tipper says, is not to beat competition but to be more useful to the purchaser. The prize of profit will come to the business that is able to attain this objective and to do so continuously. "Distribution is dependent on interchange. The stability of distribution depends on the security of the interchange, which in turn depends on its justice."

This being the case, unbalance, obviously, must result in unstable distribution, and unbalance, Mr. Tipper argues, is due mainly to moral deviations.

Production is easier to handle than distribution, he points out, because its problems are mainly internal, while those of distribution are mainly external to the individual company.

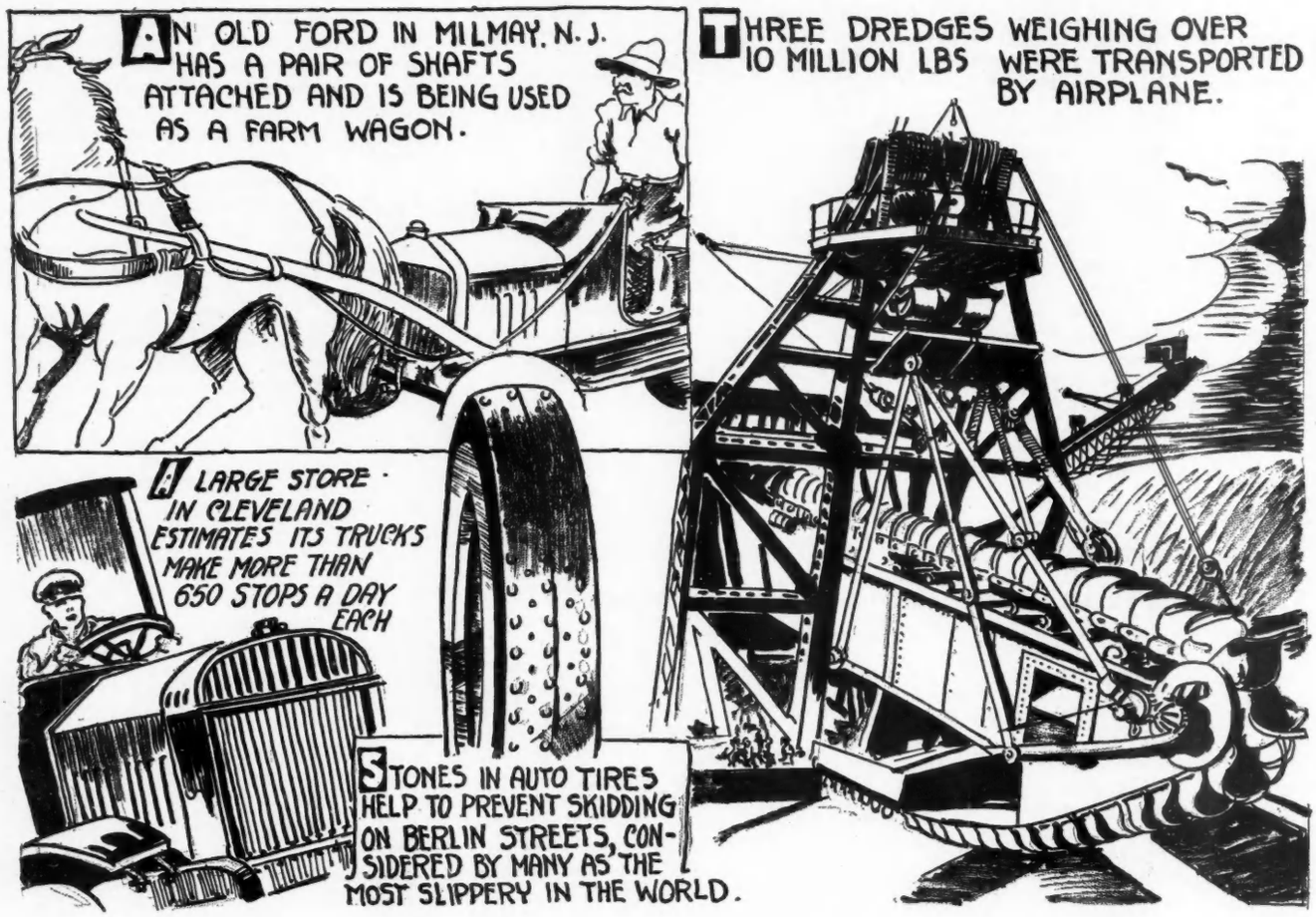
There is more need for cooperative action in distribution than in production, but it is harder to get. Men involved in distribution seem far less able to work together than do technical and scientific men who have the common interest of desire for knowledge in itself.

Depressions come as correctives to periods of inflation, Mr. Tipper says, and submits that inflation is due chiefly to "human greed and selfishness." Thus we will continue to have inflations as long as human nature remains as it is, which the author admits it will do. He does express the hope, however, that a clearer conception on the part of industrial leaders of the profit to be derived from enlightened selfishness and the continuous harm arising out of unjust and greedy competition may help to alleviate the worst phases of the recurring business cycles.

As a study and exposition of the actual basis of distribution, the major problem facing industry, this analysis ranks near the top of any list that might be compiled. It is clearly written, scholarly in its attitude and philosophic in its projections. Its practical effectiveness will be limited by the same factors which limit the usefulness of the important contribution to management thinking made by Mr. Tipper's former chief, J. D. Mooney, in "Onward Industry." It will mean much to a few men and little to many.

Since the first necessity in the approach to any problem is to state it correctly, however, Mr. Tipper may properly be said to have made an important contribution to economic and philosophic thinking about distribution, our major industrial problem.

Automotive Oddities—By Pete Keenan


AN OLD FORD IN MILMAY, N. J. HAS A PAIR OF SHAFTS ATTACHED AND IS BEING USED AS A FARM WAGON.
THREE DREDGES WEIGHING OVER 10 MILLION LBS WERE TRANSPORTED BY AIRPLANE.
A LARGE STORE IN CLEVELAND ESTIMATES ITS TRUCKS MAKE MORE THAN 650 STOPS A DAY EACH
STONES IN AUTO TIRES HELP TO PREVENT SKIDDING ON BERLIN STREETS, CONSIDERED BY MANY AS THE MOST SLIPPERY IN THE WORLD.

Write us if you know an oddity

The News Trailer

Under the subtitle, "The Handy Vacuum," J. A. Purvis, technical editor of *Automobile Trade Journal,* says, in the July issue:

"Thirty years ago it was easy to find an automobile with several feet of brass pipe between the cylinders and the mixing valve (carburetor), but the latest models of some makes use yards and yards of plumbing to conduct less than nothing, or, in other words, a vacuum, to some point where it is used to operate some labor-saving device.

"Vacuum-operated devices now do almost everything automatically for the car driver except comb his hair—if any. Another year or two of vacuum development, and all the driver will need to do is to sit down in the car and his weight will trip a gadget that will automatically start a doodad that will automatically operate a jigger, etc., etc., until the car will automatically start, and glide, or slide, away.

"Poor little intake manifold. If someone invents an engine that is not also a vacuum pump, all the car drivers will have to go back to work."

The articles into which this bit of creamy jesting is dropped is intended for service men, of course, but is also meaty reading for factory design engineers.

And while we are in a quoting humor you may enjoy the paragraph below, which is taken from an article, "What the (British) Industry Owes to Component Manufacturers," in the June 22 issue of *The Motor Trader:*

The Motor Trader being a trade paper, and not available as public reading matter, we can mention the case of an all-British car where the gear box, on being dismantled, revealed U. S. A. as the country of origin of an important part. Why not? Evidently the manufacturer wanted the part, found manufacture impossible for technical or commercial reasons, and bought it from someone not similarly restricted. It is not too much to say that by far the greater part in the development of the modern road vehicle was played by outsiders."

Something else that is hard on blue pencils: ". . . spark-plugs are mounted on the cylinder head . . ." a notice from an engine manufacturer reads.

NEWS

Mooney Hits Distribution

Faulty Methods Have Been Prime Factor in Depression, Claim

LAKE-OF-BAYS, ONT., July 1—Faulty methods of distribution were given as the greatest weakness of industrial organizations during the past decade, in an address by James D. Mooney, vice-president, General Motors Corp., in charge of overseas operations.

Mr. Mooney was one of the principal speakers at the annual convention here of the American Society of Mechanical Engineers.

"Distribution in its present chaotic state needs the attention of the engineering mind and the scientific approach with its respect for accurate identifications and standardized nomenclature, and needs a new respect for the value of truth and economic realities," he said.

The lag between effective production and inadequate distribution has been one of the underlying causes of the present economic condition, Mr. Mooney pointed out.

"In meeting the problem of employment for its wage earners," he said, "industry should be free to change wage rates up or down to meet changing economic conditions, but must also face its responsibility of providing greater economic security for its workers.

"Unemployment insurance, health and accident insurance and old-age pensions may seem to threaten industry with undue burdens of cost, but if industry does not accept a greater responsibility in providing solutions for problems of economic security, then state and Federal politicians and labor leaders surely will," he predicted.

"The costs will, in the latter event, be far greater than it would be if industry took the initiative."

Ethyl Wins Suit

NEW YORK, July 6—Validity of the trademark "Ethyl" is upheld by the United States Court for the Northern District of Texas in a suit brought by the Ethyl Gasoline Corp. to restrain Henry Klibanow of Dallas from doing business as Ethyl Laboratories.

The decision by Judge William H. Atwell, sustains the contention of the Ethyl Gasoline Corp., plaintiff in an equity proceeding, that the corporation is alone entitled to use the trademark "Ethyl," of which it is the owner.

Loomis Injured in Crash Near Camp

WESTFIELD, MASS., July 2—Edward Loomis, secretary, Motor Truck Committee, National Automobile Chamber of Commerce, was brought to the Noble hospital here early this morning when he was injured in an automobile accident near Huntington.

He was driving his automobile to his camp near Huntington when his car skidded on a gravel road, swerved into a ditch and crashed into a tree. Mr. Loomis suffered the fracture of both legs. Mrs. Loomis and two guests were thrown free of the car and escaped uninjured.

It was reported that he was showing improvement and hospital authorities expect he will be able to leave their care within a month's time.

Broadwell Resigns as Fisk General Manager

Edward H. Broadwell, for many years vice-president and general manager of Fisk Rubber Co., Springfield, Mass., announced his resignation on July 1.

"The decision of the receivers of the company to retire from the original equipment business eliminates the necessity for a manufacturers' department," he said.

Mr. Broadwell, prior to his connection with Fisk, was one of the associates of Messrs Chapin and Coffin in organizing the Hudson Motor Car Co.

Hamlen is Promoted

Harry B. Hamlen has been named assistant treasurer of the Goodyear Tire & Rubber Co. He became associated with the company in 1905 and has been manager of the credits and accounts department since 1909.

Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for Automotive Industries

NEW YORK, July 5—The more seasonable weather in several sections of the country last week tended to stimulate retail buying, but there is no pronounced activity anywhere. The immediate outlook is predominated by the thought that midsummer is not a time when a substantial revival in trade may be expected.

BANK FAILURES

The number of business failures in the United States last week, according to R. G. Dun & Co., was 617, as compared with 613 during the preceding week and 422 during the corresponding week last year.

RAILWAY TRAFFIC BETTER

There has been a moderate improvement in railway traffic. Railway freight loadings during the week ended June 18 totaled 518,409 cars, which marks an increase of 16,649 cars above those during the preceding week, but a decrease of 220,685 cars below those a year ago and a decrease of 402,236 cars below those two years ago.

GOTHAM TRADE DOWN

According to a report of the Federal Reserve Bank of New York, department store trade in that district during May was 26 per cent below that a year ago; chain store sales were 13 per cent below those a year ago; and wholesale trade was 26 per cent below.

LIGHT & POWER OFF

Production of electricity by the electric light and power industry in the United States during the week ended June 25 was 11.9 per cent below that a year ago.

CRUDE OIL PRODUCTION

Average daily crude oil production for the week ended June 25 amounted to 2,156,000 bbls., as against 2,197,550 bbls. for the preceding week and 2,441,950 bbls. a year ago.

FISHER'S INDEX

Professor Fisher's index of wholesale commodity prices for the week ended July 2 stood at 59.6, as against 59.5 the week before and 59.3 two weeks before.

BANK DEBITS

Bank debits to individual accounts outside of New York City during the week ended June 29 were 43 per cent below those a year ago.

MARKET UNSETTLED

The stock market last week was unsettled. Despite occasional rallies, the market was under pressure during the period. However, the net changes for the week were very slight excepting in the cases of some of the specialties. The volume of trading was light, not exceeding a million shares on any day.

FEDERAL RESERVE STATEMENT

The consolidated statement of the Federal Reserve banks for the week ended June 29 showed increases of $10,000,000 in holdings of bills bought in the open market and of $71,000,000 in holdings of Government securities. Holdings of discounted bills decreased $18,000,000. The reserve ratio on June 29 was 57.2 per cent, as against 57.8 per cent a week earlier and 57.9 per cent two weeks earlier.

Holiday Hits Mill Schedule

Buyers Continue Wary of Placing Large Orders for Steel

NEW YORK, July 7—While activity in the steel industry as a whole is likely to set another low record this week because of extension of the holiday at some plants and lack of a sufficient quota of orders at others, sheet mills appear to fare better than most of the other divisions as the result of fair specifications for immediate shipment by automotive consumers.

One of the large Youngstown district "independents" has put into operation twelve of its sheet mill units following the accumulation of a sufficient backlog of automotive business to keep them going for a worth-while stretch. Virtually all orders coming through are of the "ship-at-once" kind, and price or other inducements are of little avail in prying loose from purchasing agents any commitments that can be deferred.

With the going into effect of new quantity extras on cold-finished steel bars an opportunity was offered to specify against old contracts on the former basis for shipment during this month.

If any such specifications were forthcoming, it was in negligible quantities, proving that the general run of small and medium size consumers have little in the way of contract protection and that nearly all buying is done on a "when-needed" basis. While not a great deal of improvement is looked for in the steel market in July, it is thought that many consumers have been playing so close to the cushion of late that a certain amount of deferred business overhangs the market.

Pig Iron—Quiet and unchanged.

Aluminum—Dull.

Copper—Domestic buying is in abeyance with producers holding to 5⅜ cents, delivered Connecticut, and 5½ cents, delivered Middle West, as their quotation.

Tin—The London market displays slightly more firmness, but there is little change in the domestic demand. Straits tin is quoted at 20½ cents.

Lead—The leading interest announced several price reductions to bring its contract price more in line with competitive marketers who offered spot metal at as low as 2.75 cents, New York. The supply of lead at that price level is decidedly limited and any bulge in the demand is expected to result in a return to more normal values.

Zinc—Easy and dull.

"Donuts" Optional On Nash Models

KENOSHA, WIS., July 5—The Nash Motors Co. will supply special Airwheel Tire wheels and the new Goodyear Low-Pressure Airwheel tires for all of the cars in these two new Nash series at slight extra cost.

The special new wheel is a sturdy and handsome 15-in. wood wheel with a 5:50 rim and is equipped with the remarkable new "Donut" low-pressure tire which carries a pressure of 18 to 20 lb. of air.

Chrysler Shows 5-Month Gain

DETROIT, July 5—Chrysler Motors was the only automobile manufacturer to show an increase in motor car registrations the first five months this year compared with a year ago, according to the final registration figures compiled for all states and the District of Columbia, excepting Georgia, and released by B. E. Hutchinson, vice-president and treasurer of Chrysler Corp.

According to an analysis of the registrations, Chrysler Motors' first five-month registrations amounted to 110 per cent of the same months of 1931. The industry as a whole was only 52.8 per cent of a year ago.

Plymouth made the outstanding showing, with 291.1 per cent of its previous year's registrations, while DeSoto was not far behind with 114.1 per cent.

Chrysler Motors' registrations were 120 per cent of May, 1931, and 105.7 per cent of April this year. Plymouth established a record with 433.5 per cent of last year's May and 122.6 per cent of April, 1932. Plymouth improved its position from thirteenth in May, 1931, to third in this year, while DeSoto stepped up from fourteenth to sixth.

The corporation's increase in percentage of the industry's total registrations, which was 11.4 per cent, again is by far the greatest in the industry, as well as being in excess of its own percentage increase for the entire five-month period.

Carboloy Announces New Price Schedule

The Carboloy Co., Inc., subsidiary of the General Electric Co., announced a general reduction in the price of Carboloy cemented carbide tools and raw metal. The new price schedule is based upon a sliding scale according to the total weight of Carboloy metal in each individual tool or blank.

Offers Engineering Degree

NEW YORK, July 5—Under the progressive leadership of Prof. George F. Bateman, dean of the schools of engineering of Cooper Union, the institute has completed a realignment of the night school which will enable students to receive college degrees. For 70 years Cooper Union has offered coordinated five-year night engineering courses to young men employed during the day in the engineering profession. Beginning next fall, the institute will go on a six-year program comprising a weekly schedule of four nights of three hours each. Instruction is free.

New Harmsworth Course Planned

Seven-Mile Oval Will Be Laid Out on Lake St. Clair

DETROIT, July 9—A new seven nautical mile oval course, with three-mile straightaways and half-mile turns, will be laid out on Lake St. Clair at Detroit next September for the eighteenth running of the British International (Harmsworth) Trophy Races, it was announced today by W. D. Edenburn, chairman of the race committee of the Yachtsmen's Association of America.

The seven-mile course is the minimum length over which the Harmsworth can be run under the new rule adopted last fall. The races will be five laps, or 35 nautical miles, which also creates a new distance for the classic. Previous races have been 30 nautical miles in length.

Edenburn announced that the course has been approved by Harry B. Greening, of Hamilton, Ont., chairman of the American Power Boat Association racing commission, who will represent the Royal Motor Yacht Club and Harmsworth heirs on the International Commission in the September races.

The race course will be paralleled for practically its entire length by Lake Shore Drive in Gross Pointe, off which the oval will be marked. The outside straightaway will be within 1000 ft. of the shore, and the greatest distance the competing boats ever will be from the shore line will be 4000 ft. when they come down the inner leg. No boats will be permitted to anchor inside the course, which will assure spectators on the shore an unobstructed view of the races.

The races have been scheduled for Friday and Saturday, Sept. 2 and 3, with a third or deciding match on Labor Day, Sept. 5. The Harmsworth trophy goes to the country which first wins two races.

Great Britain has again challenged for the Harmsworth Trophy, and Lord Wakefield plans to send Kaye Don over with Miss England III, a new boat which proved disappointing in her inaugural trials on Lake Garda a few weeks ago. New motors are being placed in the craft, however, and Don momentarily is expected to make another speed trial on Loch Lomond.

Gar Wood, the American defender, also has a new craft ready for the classic, Miss America X, a much longer and heavier boat than any of the previous Miss Americas. The motors from Miss America IX, the present world record holder, will be used in the new 38-ft. craft. The powerplants are now undergoing an overhauling, and with redesigned superchargers and a new carburetion system, Wood expects even greater speed than the present 111.719 mile an hour mark.

Indications of Strength Seen In World Rubber Situation

Declines in Production Reported From Major Growing Areas and Relatively High Consumption Points Way to Supply-Demand Balance in Crude

Possibility of approaching restoration of a more normal balance between world supply and demand for rubber is indicated in recent reports received by the Rubber Division of the Department of Commerce. Preliminary May statistics issued by the Rubber Growers' Association (London) reveal a decline of 36 per cent in production of estates in Ceylon as compared to May, 1931; a decline of 33 per cent for estates in Java; 32 per cent in Borneo, and 93 per cent in India.

The decision against restriction, issued by the British and Dutch Governments, March 19, appears to be leading to substantial curtailment of estate production in the above areas, it is pointed out.

Production of Dutch native rubber also has been curtailed sharply in each month of 1932, and the production of rubber by small holders in Malaya has declined somewhat. Against this, however, estates in Malaya and in Sumatra have made new high records of production monthly, thus far, in 1932.

On the other hand, the absorption of rubber in countries outside the United States is running well ahead of absorption in past years.

Should the present high rate of absorption be maintained for the balance of the year, and should the tendency revealed by preliminary May statistics toward reduction of output in the East likewise be maintained, the restoration of a balance between rubber supply and demand toward the end of this year would seem within the range of possibility.

Rubber stocks in the United Kingdom are now about 12,000 tons lower than at the end of 1931. The principal world stocks of rubber, however, are held in the United States, where supplies have increased from about 322,000 tons at the end of December to 350,000 tons at the end of May.

Any improvement in the price of rubber that might result from an improvement in the statistical position would benefit American interests holding these stocks.

Wayne Sales Hit New High

Car Registrations Boosted As Ford Hits Stride

DETROIT, July 5—With other manufacturers holding to about May sales levels, increasing Ford registrations pushed Wayne County sales into new high territory for June, exceeding June, 1931, figures by better than 10 per cent, and May, 1932, by about 31 per cent. Ford accounted for 62 per cent of new passenger cars registered, with more eights than fours, in spite of the fact that eights were still scarce and fours available in abundance.

Aside from Ford, the Chrysler group through Plymouth and DeSoto and the Studebaker group with all three of its makes made the best showing. DeSoto, Nash and Studebaker sales for June exceeded both May and last June. Plymouth sales for June were better than for the entire first six months of last year. Auburn's price reductions boosted its June sales over May. Other companies showing increased sales include Hupmobile and Packard.

The surprisingly good showing of the middle-priced group was a feature of June sales. With Nash and Studebaker ahead, Buick managed to hold to its May levels, although behind last year's figures.

Total registrations for June were 6611, compared with 5059 in May and 6003 in June of last year. Ford was first with 4119 cars, Chevrolet second with 871 and Plymouth third with 464.

Sales of commercial vehicles exceeded May by 37 per cent but remained behind June, 1931, figures by 31 per cent in spite of increased Ford sales. Compared with last year, however, June showed a gain over May, whereas last year there was a normal decline in sales. Dodge and Reo commercial sales continue ahead of last year.

DeSoto Enjoys Biggest Week

DETROIT, July 6—Weekly sales records of the DeSoto dealer organization were broken during the week ended June 25, when sales rose to the new high total of 2008 cars. This is a ten per cent increase over the best previous week—the week ended April 30, a 100 per cent increase over the corresponding week of last year and a 15 per cent increase over the preceding week of this year. These figures include Plymouth sales.

Used car sales by DeSoto dealers during the same week totaled 1725 as compared with 1140 for the corresponding week of a year ago, a gain of 50 per cent.

Eves Joins Marquette

A. P. Eves, for 25 years associated with International Harvester Co., has been appointed chief chemical engineer of Marquette Petroleum Products, Inc.

Canadian Imports Sharply Reduced

Parts and Accessories Down One-Third, Cars Off 75%, Dominion Reports

TORONTO, July 5—Canada's imports of parts and equipment for motor vehicles are down one-third, based on recorded values, while the valuation of imported passenger cars has been reduced 75 per cent, with the reduction in the value of imported commercial cars being in even greater ratio.

These facts are determined in a summary of Canada's trade for the 12 months ending April 30, as compared with the previous 12 months, as prepared by the Dominion Government for the consideration of the Empire delegates to the Imperial Economic Conference which opens at Ottawa on July 21.

The figures reveal that the number and value of passenger automobiles purchased from Great Britain both increased during the latest 12-month period, compared with the previous year, although the figures are relatively small to those covering similar imports from the United States. The fact that passenger car imports from Great Britain are higher will be of some interest to the Conference, however.

Total imports of parts and equipment for the 12 months ending April 30 last reached a valuation of $12,346,922, as compared with $19,171,850 for the previous period. Practically all of this material came from the United States and entered into the construction of motor vehicles in Canada.

Passenger cars to the number of 3658, valued at $2,904,834, were imported into the Dominion during the last period, as against 15,327 for the previous yearly period, with a value of $11,992,315. Imports from Britain were:

1932—76 cars; value, $253,549.
1931—51 cars; value, $200,264.

Passenger automobiles to the number of 3570 were imported from the United States in the 12 months up to April 30 last, and these were valued at $2,634,821. One year previously the figures were: 15,258 cars; value, $11,749,833. Higher excise and tariff schedules had something to do with this difference, as well as economic conditions.

During the latest period, 702 freight automobiles, valued at $788,252, were imported into Canada, of which 664 were from the States and 37 were from Great Britain.

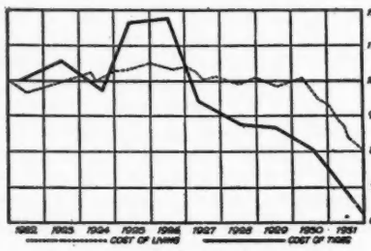
One year previously, 2707 commercial vehicles, with a value of $3,632,028, had been imported, of which 2624 were from the States and 81 from Great Britain.

63c. Buys More Than Did Dollar

Tire Values Increase as Price Drops, Data of General Tire Shows

AKRON, July 5—Today, 63 cents will buy more value in automobile tires than a dollar would have bought 10 years ago.

It would take 83 cents, however, to buy today the same value, in all other



How cost of tires have dropped under cost of living.

commodities that enter into the cost of living, that a dollar would have bought in 1922.

This is shown in the above graph, prepared by General Tire and Rubber Co. from information furnished by the National Industrial Conference Board and the Rubber Manufacturers' Association.

While tires are vastly safer and better in every way than they were 10 years ago, they are 20 per cent cheaper than the average of all other items in the cost of living.

Motor Leaders Help in Detroit Crisis

B. E. Hutchinson, secretary-treasurer, Chrysler Motors, headed a committee of industrialists who met with city officials of Detroit July 5 to discuss plans for helping the city to meet its present financial crisis. Most of the larger taxpayers pledged themselves to pay immediately taxes which do not fall due until next December. Mayor Murphy has agreed to cut city salaries by $7,000,000.

Automotive executives who attended the meeting included Alvan Macauley, president, Packard Motor Car Co.; Edsel Ford, president, Ford Motor Co.; Charles Fisher, Fisher Body Co.; C. W. Avery, president, Murray Corp.; A. E. Barit, treasurer, Hudson Motor Car Co.; W. C. Keith, treasurer, Continental Motors Corp.; and Henry Ewald, president, Campbell-Ewald Co.

Merit Men Convene

DETROIT, July 7—One hundred and twenty Cadillac retail salesmen, representing every state, will arrive here tomorrow for a three-day session of the Cadillac Merit Men's organization which is composed of leading retail salesmen.

Canadian Duty Added to U. S. Levy

WASHINGTON, July 5—Automobiles, parts and accessories, tires and tubes are included in the list of goods subject to excise tax in the United States which will be increased by the amount of the taxes for the assessment of regular duty when imported into Canada.

In addition to the regular duty, a dumping duty is to be collected equal to the taxes, according to reports from Assistant Commercial Attache O. B. North, Ottawa.

100 Dodge Trucks to Pa.

One hundred 1½-ton Dodge trucks were delivered this week to the Pennsylvania Highway Department.

Bohannon Sails

James A. Bohannon, president, Peerless Motor Car Corp., sailed with his family early Saturday from New York City on the SS President Johnson for an extended European tour.

They will return to the United States late in September, sailing from Southampton.

Industry Aids Rail Loading

Manufacture and Use of Motor Vehicles Account for Increased Ratio

NEW YORK, July 6—Railroad freight shipments resulting from the manufacture and use of automobiles are making a better comparative showing during the depression than other manufactured goods.

Shipments of all articles classified by the Interstate Commerce Commission as manufactures and miscellaneous amounted to 7,816,414 carloads in 1931. Of this number 2,254,845 carloads are traced by J. S. Marvin, general traffic manager, National Automobile Chamber of Commerce, to shipments of motor vehicles, parts and materials, tires, gasoline, iron and steel, lubricants, and brick and cement for highways, or 28.8 per cent of the total shipping in the manufactures group.

This is an increase from 23 per cent in 1929 and 24 per cent in 1930.

The chamber also finds that shipments of factory coal, lumber, crude rubber and petroleum, together with gravel, sand and other materials for highway building, all of which are classified by the Commission as Products of Forests and Mines account for 7.6 per cent of the shipping in that group against 4½ per cent in 1929 and 5.8 per cent in 1930.

Plymouth Taxicab Announced

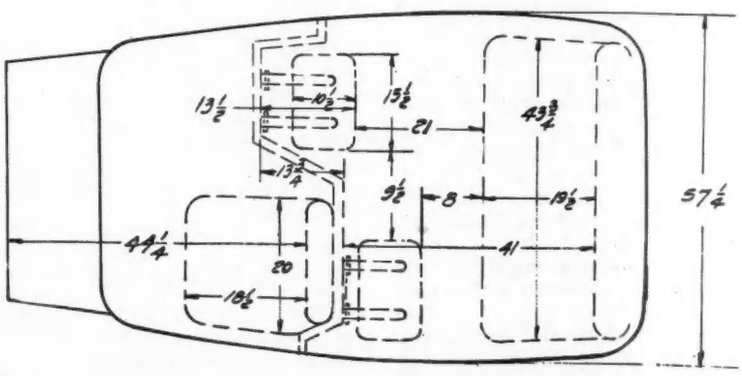
DETROIT, July 5 — Announcement has been made by the Plymouth Motor Corp. that a five-passenger Plymouth taxicab conversion has been developed.

The taxicab is based on the standard four-door sedan, using the same body, upholstery and seat cushion.

The front cross-seat has been removed and replaced by a fixed driver's seat upholstered in leather and a partition provided, separating the driving compartment from the rear. It is faced with leather and is fitted with safety glass.

Two auxiliary seats of the folding type are provided, as well as a space for luggage.

The partition and driver's seat are built into the car in such a manner that they may be removed for reconversion into a passenger car for resale to the public. List price is $670, or $35 more than the standard Plymouth sedan model.



Plan of new Plymouth taxicab, showing provisions for ample leg-room for passengers.

New Aircraft-Engine Requirements Proposed by Department of Commerce

(Continued from page 46)

he may desire the engine to be approved with. Engines may be approved with other optional accessories or changes in accessories provided the airworthiness of the engine with the new accessories is demonstrated to the secretary by sufficient technical data, including certified reports of tests where necessary. Additional endurance tests of the engine as described in Section 3 may be necessary if the accessory change constitutes a major modification to the engine.

Engine accessories as described in the above paragraphs of this section are not eligible for separate approval by the Secretary of Commerce.

Sec. 8. Test Report

The manufacturer may be furnished a copy of the complete report concerning the test of his engine, but such report shall not be used in part or as a whole for advertising purposes.

Sec. 9. Engine Speed

An approved engine, or an engine with an approved calibration, installed in a licensed aircraft shall be equipped with a propeller so designed or adjusted that at full throttle the engine speed will not exceed 105 per cent of the official rated speed in level flight at sea-level altitude.

Sec. 10. Identification Data

All engines used in licensed aircraft shall be provided with an identification plate which is permanently attached to the engine. It shall be readily accessible when the engine is installed in the aircraft and shall contain the following information: Name and model designation of the engine, manufacturer's name, serial number, approved rated power, approved rated speed, compression ratio, impeller or supercharger gear ratio, and carburetor venturi size.

Casings Shipments Show Increase

NEW YORK, July 6—Shipments of pneumatic casings for the month of April amounted to 3,697,630 casings, an increase of 25.2 per cent over March this year, but were 25.0 per cent below April, 1931, according to statistics released by The Rubber Manufacturers Association, Inc., today.

This organization reports production of pneumatic casings for April to be 3,516,861 casings, a decrease of 4.2 per cent under March this year and 28.9 per cent below April, 1931.

Pneumatic casings on hand April 30 amounted to 9,845,820 units, a decrease of less than 1 per cent under March and 1.9 per cent below April 30, 1931.

The actual figures are as follows:

PNEUMATIC CASINGS

	Shipments	Production	Inventory
April, 1932..	3,697,630	3,516,861	9,845,820
March, 1932.	2,954,040	3,671,090	9,877,823
April, 1931..	4,931,906	4,944,364	10,031,419

Heads DeSoto Area

A. E. Creeger has been appointed Boston district manager for DeSoto Motor Corp., succeeding F. L. McNulty, resigned.

Reynolds Reports Loss

DETROIT, July 5—Reynolds Spring Company, Jackson, Mich., has reported net loss of $77,368 for quarter ended March 31, 1932.

Ohio Employment Down

COLUMBUS, July 6—The Bureau of Business Research of Ohio State University, in a tabulation of employment during the first half of the year, shows that in the automobile and automotive parts industries, total employment for the first six months of 1932 was 28 per cent below the levels of the corresponding period last year.

In the tire and tube industry total employment for the first half was 5 per cent below that of the corresponding period in 1931. June employment was practically the same as that of May this year but declined 8 per cent from June last year. Of the 11 reporting concerns in June, seven reported increases in employment over May, three showed decreases and one showed no change.

Hupp Reports Assets

DETROIT, July 5—Hupp Motor Car Corp. has reported current assets of $11,210,566 against current liabilities of $1,447,811 as of March 31, 1932.

Dodge Sales Gain

DETROIT, July 5—Dodge retail deliveries of passenger cars and trucks for the week ending June 25, increased 31.2 per cent over the previous week and registered a gain of 47.9 per cent over the same period last year. It was also the highest week since last August.

Phillips Elected by N.I.A.A.

At a recent special meeting, Stuart G. Phillips, advertising manager, Dole Valve Co., Chicago, was elected secretary-treasurer of the National Industrial Advertisers Association.

He has been active in the Engineering Advertisers Association.

Streamline Cars Tempt Railroads

Rail Engineers Report Favorably on Speedy Passenger Coaches

CHICAGO, June 29—Members of the mechanical division of the American Railway Association at their recent thirteenth annual convention in the Congress Hotel here discussed streamlined motor cars designed for speed as a means of recapturing lost passenger business.

Application of streamline design to rail motor cars could be undertaken for the purpose of not only reducing air resistance at the higher speeds for the sake of increased economy, but creating a special high-speed type of self-propelled rail motor car, a report submitted to the committee on automotive rolling stock stated.

The report continued:

"By the creation of a special high-speed type of rail motor car there should be some very attractive fields of application where traffic could be stimulated and built up to profitable amounts. Certainly, really high-speed operation of comfortable, clean cars, free from the annoyance and discomfort of smoke and cinders, should make a favorable appeal for patronage and should offer strong competition to both passenger buses and airplanes. In view of the present-day demand for speed, any agency tending to do this is worthy of consideration."

Due to decline in passenger travel during recent years necessitating reduction in operating expenses particularly over branch lines and elsewhere, where traffic is light, there has been a marked increase in the use of rail motor cars. Since January 1, 1932, the report points out, 64 railroads in the United States and Canada have placed in service 769 rail motor cars. Eight years ago the average horsepower was 97.5 but this has gradually increased until today the average is 508 hp., while one unit is now being built containing 900 hp.

Practicability of rubber-tired wheels for rail cars and what can be done through increased use of aluminum and similar metals to reduce the weight of cars are also under consideration by the railroads.

Heads Columbus Ford

R. A. Marker has been appointed assistant manager of the Columbus, Ohio, Ford assembling plant, succeeding A. C. Conant, who has been transferred to Des Moines, Ia.

G. A. Liles recently was named manager. He formerly held that position at Omaha, Neb.

Marker has directed sales of 11 Ford branches for the last two years.

Highway Users Organize in Fight Against Injustice in Tax Levies

Alfred P. Sloan, Jr., Heads Vehicle Owners' Group, Representing Wide Range of Interests, as a Clearing House

WASHINGTON, D. C., July 5—Seriously disturbed by the recent sharp increases in automotive taxes and taxes on products entering into the use of motor vehicles, representatives of some 50 national agricultural, industrial and private using groups met here yesterday to see what could be done to stiffen resistance to further burdens.

At the conclusion of the session an informal Highway Users Conference was decided upon as a clearing house for the development of facts bearing upon this question and an advisory committee was created to set up a plan of operation.

The conference was presided over by Alfred P. Sloan, Jr., president of General Motors Corp. and a member of the board of the National Automobile Chamber of Commerce.

Discussing the problems which confront the owner of a motor vehicle today, Mr. Sloan pointed out that the new federal excise taxes upon automobiles, trucks, tires, parts, accessories, oils and gasoline will add $258,000,000 to a load already amounting to more than $1,000,000,000 annually in special taxes assessed against vehicle users.

"To the extent that there is economic justification for taxes upon users in return for highway development, no one can find much fault with them," said Mr. Sloan. "But when we see the vehicle becoming an instrument for general taxes of all sorts far beyond those which the user should pay, then a halt must be called.

"Otherwise, the whole structure of our highway transportation will be menaced and the individual who uses the road will find himself saddled with operating costs which will add materially to the cost of movement and of goods."

Succeeding speakers noted that gasoline taxes now amount to from 110 to 125 per cent of the wholesale cost of the product, an evident immediate effect of serious dimensions being an increasing tax evasion and "bootlegging" of the commodity.

Attention was also called to the fact that in Southern and Southeastern States, gasoline and license taxes now paid annually by trucks of 3½ tons amount to from $1,000 to $2,000 per vehicle with the figure frequently running higher when the operation is by common carrier.

Evidence of a widespread misconception of the facts of motor transportation can be found on all sides, according to one speaker. In his judgment, "more courtesy on the part of motor vehicle drivers and a better recognition of safety principles in operation are essential.

"The public, too, frequently does not understand the necessary function which the truck performs as it delivers milk, bread and the other necessities or comforts of life.

"When the public knows that these vehicle users are more than paying their shares of the cost of the roads which they use in common with all others, there will be less disposition on the part of legislators to make the user carry the costs of government in his vehicle."

Crude Rubber Consumption Up

Consumption of crude rubber by manufacturers in the United States for the month of May amounted to 29,197 long tons as compared with 25,953 long tons for April 1932, and represents an increase of 12.5 per cent, according to statistics released by The Rubber Manufacturers Association.

This organization reports imports of crude rubber for the month of May to be 32,224 long tons, a decrease of 12.9 per cent below April but were 1.6 per cent above May a year ago.

This association estimates total domestic stocks of crude rubber on hand May 31, at 346,231 long tons, which compares with April 30 stocks of 343,098. May stocks show an increase of 1 per cent above April of this year and 56.8 per cent above the stocks of May 31, 1931.

The participants in the compilation report 50,453 long tons of crude rubber afloat for the United States ports on May 31, which compares with 40,387 long tons afloat on April 30, 1932, and 55,173 long tons afloat on May 31, 1931.

Chevrolet Delivers 550 Trucks to Post Office

DETROIT, July 5—First of a fleet of 550 post office trucks complete with bodies, recently contracted for by the Federal Government with the Chevrolet Motor Company, are to be delivered July 15, Chevrolet officials announced here today.

This contract, one of many awarded Chevrolet by users of large commercial fleets, brings the volume of this type of business for the first six months of the year considerably ahead of any previous month period, according to H. J. Klingler, vice-president and general sales manager.

Hudson-Essex Invites Distributors to Preview

DETROIT, July 5—Another group of Hudson-Essex distributors arrived in Detroit for a meeting with factory executives. The first detachment of distributors spent Monday and Tuesday in Detroit.

While no definite announcement has been made by Hudson officials it is generally understood that Hudson will soon announce a new and radically different type of automobile. The car is reported to be in the lower priced field. Distributors were here not only to discuss business outlook for the remainder of the year but also to preview and ride in the reported new car.

Westinghouse Pays Quarterly Preferred

Directors of the Westinghouse Electric & Mfg. Co. declared the regular quarterly dividend of 87½ cents a share on preferred stock and omitted the quarterly dividend of 25 cents on the common stock.

In view of the earnings situation of the company for some little time, it was the unanimous opinion of the directors that the company should conserve its cash resources and not further reduce the surplus by payment of any dividend on the common stock.

The company has no outstanding bonds or bank loans and is in very sound financial condition as to cash and net quick assets.

Graham-Paige Gains

DETROIT, July 5—Graham-Paige reports production and sales in June exceeding May and April. Shipments of new units totaled 1276. Dealers report June registrations running ahead of May, with a marked increase in sales during the last two weeks. Export orders also picked up, reaching the highest total in four months.

The original production schedule for June was stepped up twice to meet the demand for 1933 model streamline Graham Six. July production will continue on the present schedule, the factory working five days a week.

French Ford Earns $1,293,000 Gross

The gross earnings of the French Ford Motor Co. for 1931 amounted to 44,352,212 francs ($1,293,000), as compared with 62,142,288 francs the previous year.

Rockne Gains 25%

DETROIT, July 5—Rockne deliveries by dealers for the first 20 days of June exceeded by 25.3 per cent deliveries for the first 20 days of May, F. L. Wiethoff, sales manager of Rockne Motors Corp., reported today.

Daily Average Gasoline Use Dropped 2.75 Per Cent in April

The figures set out below, which are based upon the quantity of gasoline sold or offered for sale, as reported by wholesalers and dealers in the states listed, under provisions of the gasoline tax or inspection laws, reflect, as nearly as it has been possible to obtain it, the consumption of gasoline during April, 1932, with previous month and year ago comparisons.

While it is felt that the figures herewith are fairly comparable, it must be borne in mind that more or less widespread tax evasion and changes in the basic laws under which the figures were collected over the period compared may have disturbed the comparability of the figures. It is, therefore, not correct to base percentage changes in demand upon the figures presented herewith. All demand calculations used by the American Petroleum Institute are based upon Bureau of Mines monthly statistics, which we regard as being more truly indicative of actual consumption. As we see the figures set out below, they represent a break-up, as nearly correct as it is possible to obtain it, by states, of the total demand in the United States, as calculated from Bureau of Mines monthly statistics.

GASOLINE CONSUMPTION BY STATES, APRIL, 1932

	Tax Rate April Cents	Month of March, 1932 Gallons	Month of April, 1932 Gallons	Month of April, 1931 Gallons	4 Months Ending With April, 1932 Gallons	4 Months Ending With April, 1931 Gallons
Alabama	5	11,729,000	12,265,000	13,949,000	45,909,000	51,004,000
Arizona	5	6,332,000	6,121,000	6,644,000	23,362,000	24,205,000
Arkansas	6	8,177,000	9,053,000	9,939,000	36,374,000	40,324,000
California	3	115,761,000	117,074,000	118,205,000	435,626,000	454,007,000
Colorado	4	13,330,000	14,226,000	15,124,000	49,081,000	51,083,000
Connecticut	2	17,491,000	19,430,000	19,487,000	67,982,000	63,772,000
Delaware	3	2,975,000	2,992,000	1,617,000	11,143,000	9,243,000
Dist. of Col.	2	7,658,000	8,914,000	7,881,000	31,266,000	27,410,000
Florida	7	20,191,000	18,697,000	20,226,000	80,709,000	86,407,000
Georgia	6	17,031,000	16,643,000	17,939,000	66,759,000	67,910,000
Idaho	5	2,845,000	4,116,000	4,935,000	11,933,000	14,738,000
Illinois	3	69,881,000	82,129,000	82,405,000	288,504,000	285,247,000
Indiana	4	36,784,000	39,604,000	42,176,000	138,276,000	136,453,000
Iowa	3	26,428,000	37,041,000	33,908,000	108,561,000	121,734,000
Kansas	3	21,980,000	25,366,000	†24,327,000	92,074,000	99,788,000
Kentucky	5	11,856,000	13,148,000	14,202,000	48,278,000	49,766,000
Louisiana	5	13,629,000	13,778,000	15,620,000	54,164,000	56,742,000
Maine	4	5,396,000	6,851,000	7,716,000	22,556,000	20,870,000
Maryland	4	14,144,000	16,004,000	15,771,000	56,370,000	53,222,000
Massachusetts	3	39,876,000	44,872,000	48,045,000	154,419,000	150,579,000
Michigan	3	52,682,000	64,371,000	70,026,000	224,026,000	227,097,000
Minnesota	3	28,154,000	34,959,000	36,323,000	108,536,000	118,327,000
Mississippi	5½	*7,984,000	*8,797,000	9,915,000	*32,747,000	35,214,000
Missouri	2	29,853,000	38,026,000	42,858,000	130,951,000	142,508,000
Montana	5	4,203,000	7,433,000	8,276,000	17,811,000	22,166,000
Nebraska	4	16,087,000	19,839,000	17,284,000	60,000,000	68,620,000
Nevada	4	1,742,000	1,964,000	1,969,000	6,471,000	5,742,000
New Hampshire	4	3,714,000	4,416,000	4,558,000	14,881,000	13,614,000
New Jersey	3	52,053,000	57,204,000	59,047,000	207,502,000	199,423,000
New Mexico	5	3,625,000	3,798,000	4,341,000	13,907,000	15,154,000
New York	3	101,846,000	123,769,000	129,047,000	447,523,000	428,199,000
North Carolina	6	17,265,000	18,654,000	18,491,000	78,770,000	77,406,000
North Dakota	3	7,563,000	13,190,000	13,978,000	26,818,000	32,503,000
Ohio	4	72,227,000	80,630,000	82,462,000	278,666,000	281,750,000
Oklahoma	4	22,395,000	22,392,000	22,047,000	85,899,000	92,095,000
Oregon	4	15,293,000	12,017,000	15,082,000	47,798,000	49,086,000
Pennsylvania	3	78,136,000	83,327,000	66,751,000	305,275,000	282,384,000
Rhode Island	2	7,384,000	8,064,000	7,273,000	28,342,000	25,688,000
South Carolina	6	8,649,000	8,968,000	10,158,000	33,629,000	37,375,000
South Dakota	4	7,982,000	13,161,000	12,669,000	31,691,000	42,002,000
Tennessee	7	14,831,000	15,099,000	17,068,000	59,618,000	62,535,000
Texas	4	61,249,000	61,259,000	66,550,000	231,173,000	244,775,000
Utah	4	3,636,000	4,865,000	5,598,000	15,471,000	17,573,000
Vermont	4	2,414,000	2,864,000	3,247,000	9,558,000	9,314,000
Virginia	5	17,063,000	18,822,000	19,531,000	68,159,000	65,900,000
Washington	5	21,949,000	20,293,000	29,202,000	73,136,000	82,896,000
West Virginia	4	8,450,000	10,642,000	11,165,000	35,504,000	35,331,000
Wisconsin	4	26,510,000	34,032,000	32,778,000	112,051,000	120,523,000
Wyoming	4	2,286,000	2,768,000	3,040,000	8,672,000	9,832,000
Total		1,160,719,000	1,303,947,000	1,340,850,000	4,617,931,000	4,709,536,000
Daily Average		37,443,000	43,465,000	44,695,000	38,165,000	39,246,000
Change from previous year:						
Total Decrease		.....	36,903,000	.....	91,605,000	.....
Percentage Decrease in Daily Average		.....	—2.75%	.....	—2.75%	.....

*—Estimated. †—Revised.

Case Outlook Reported Good

CHICAGO, June 29 — Earnings outlook for J. I. Case Co., like that for the farm equipment industry generally, continues impressive, trade circles report, and hope for nominal profits has been postponed until autumn, when the next large buying season ordinarily takes place.

Current operations are on a restricted basis, consistent with the seasonal lull.

Case reports a large share of the replacement parts orders enjoyed by all implement companies. While officials state this business is profitable, they point out that it reflects an increasing disposition on the part of farmers to make old machinery suffice. However, the replacement business is generally for cash.

Record Week at Plymouth Plant

DETROIT, MICH., July 5 — Shipments of Plymouth cars from the mammoth Plymouth plant here during the week ending June 18 totaled 6700 units as compared with 2804 units in the corresponding week a year ago, according to a statement authorized by Plymouth Motor Corp. today.

This represents an increase of 161.5 per cent.

One of the largest days in the history of Plymouth occurred June 20, when a total of 1790 Plymouth cars were shipped by rail, driveaway and truckaway to all parts of the United States. Production for the first twenty days in June totaled approximately 14,000 units, it was stated.

A sharp upturn in retail deliveries of Plymouth cars was likewise reported by the DeSoto, Dodge and Chrysler dealer organizations for the week ending June 18. This week showed an increase of 14 per cent over the week ending June 11, it was stated.

Named Dura Receivers

TOLEDO, July 5—On complaint of Republic Steel Corp. and Raymond C. McCullough, vice-president of the company, receivers have been appointed in federal court for the Dura Co., manufacturer of automobile hardware. Consent to the receivership was filed by the president.

L. W. Rohr and J. W. Lyons, both of Toledo, were named receivers and were empowered to sell property of the company and discharge or employ officials of the concern. Reorganization is expected.

The Republic Steel Corp. in its petition alleged that the Dura Co. owed it $21,820. McCullough is a holder of class A stock in the concern as well as being an officer.

Has Biggest Month

June was for the Flxible Co., bus, funeral car, and ambulance builders of Loudonville, Ohio, the biggest month in the history of the company. Sales passed the best previous month's record by nearly 15 per cent in actual dollar volume.

This high mark in sales comes after a steadily increasing volume over the past six months. According to company officials this is not due to any unusually large order, but rather is the result of a cumulation of steady average orders, nearly equally divided among buses, funeral cars, and ambulances.

The concentrated sales drive, started in January, has thus justified increased selling expenditures. If this record is a barometer of the possibilities for the remainder of 1932, it is only another proof that the courage to expend real selling effort now will be rewarded more than normally because so few have that courage.

George K. Burgess Dies in Washington

WASHINGTON, July 7—Dr. George K. Burgess, director of the Bureau of Standards, died from a cerebral hemorrhage last Saturday morning. He was stricken while discussing the economy bill with members of the staff, and passed away while being rushed in an ambulance to Emergency Hospital. He suffered a lighter attack of the same kind on Oct. 28.

Dr. Burgess, a world figure in the field of science, was well known to the automotive industry and was affiliated with numerous technical and scientific organizations. Secretary of Commerce Lamont declared that Dr. Burgess was admittedly in the first ranks of metallurgists of the country and that his work in this field during the war won him nation-wide recognition. His passing, Secretary Lamont said, will be a very definite loss to the scientific profession of this country with which he had long been connected.

Dr. Burgess was 58 years of age and was born in Newton, Mass. He was appointed director of the bureau on April 21, 1923. He became connected with the bureau in 1903 and was placed in charge of pyrometry. Later he developed the division of metallurgy, of which he was the head before being made director. He was a graduate of the Massachusetts Institute of Technology and later studied at the Sorbonne, in Paris. He was a past president of the American Society for Steel Treating and the American Society for Testing Materials.

Studebaker, Rockne Exports Show Gain

SOUTH BEND, Ind., July 5—Exports of Studebaker and Rockne cars to world markets for the six months just completed showed an increase of 6½ per cent over the first half of 1931, according to a statement made here today by Arvid L. Frank, vice-president and general manager of Studebaker - Pierce - Arrow Export Corp.

"Studebaker's percentage of total car exports to world markets during the first five months of the year increased more than 100 per cent over the 1931 figures," he said, in commenting on the company's improved business. "While our gain over last year is a modest one, it becomes an imposing figure when compared with the 58 per cent decline in car exports suffered by the industry as a whole for the first five months. The combination of our gain and the industry's loss accounts for the very substantial improvement in our comparative position.

"Studebaker and Rockne car shipments in June showed an increase of 49 per cent over last June," Mr. Frank continued, "which is the largest gain over 1931 registered during any month this year. The month's shipments were 12½ per cent ahead of May.

"June has proved extremely encouraging not only because of the increase, but because a large portion of our business during the month represented reorders from dealers who had received and disposed of heavy earlier orders of Studebaker and Rockne models.

"If June is any indication," he concluded, "our business for the coming six months will show marked improvement over the last half of 1931."

U. S. Extends Tire Life

DETROIT, July 5—A new type of construction designed to prolong the life of heavy service tires is announced by the United States Rubber Co. The type is known as Shock Ply Construction.

Shock Ply Construction provides for the use of two cord breaker plies of special design embedded in the tread rubber and extending from bead to bead that serve as a new and better means for anchoring the tread and sidewalls to the carcass. During curing the tread rubber beneath the shock plies blends with the carcass cushion rubber and serves to still further weld the tread and carcass into a single unit.

Company officials claim the following advantages are offered by Shock Ply Construction: 36 per cent greater resistance to tread separation; 33 1/3 per cent greater resistance to side cover blows, and 15 per cent greater resistance to broken fabric.

7-Cent Gas Tax Fails to Boost Revenues

TALLAHASSEE, FLA., July 5—Florida's revenue from the seven-cent gasoline tax during April and May was less than received during the same two months of last year under the six-cent tax, according to figures just made public here by State Comptroller Ernest Amos.

In April, 1931, total sales of 22,316,300 gal. of gasoline brought $1,341,677 in revenue, while 12 months later the sales had dropped to 18,647,241 gal. and the revenue under the heavier tax to $1,305,306, a decrease of three per cent.

During May, 1931, the total sales were 20,110,981 gal., which brought $1,206,658 under the six-cent tax. The sales in May, 1932, dropped to 16,391,975 gal. and the revenue to $1,147,438.30 under the larger tax, a decrease of five per cent.

Martin H. Matheson

Word has been received here of the death of Martin H. Matheson, 42, formerly general superintendent of the Pontiac plant, in Grace Hospital, Detroit. Mr. Matheson had been connected with the local plant for five years, at one time being manager of the sheet metal division before being promoted to general superintendent. He left Pontiac to join the Budd Wheel Co. at Philadelphia, but returned to Detroit to undergo an operation at Grace Hospital.

Mr. Matheson was well known in Pontiac. Surviving are a wife and three children.

+ + CALENDAR OF COMING EVENTS + +

FOREIGN SHOWS

Llandrindod, Wales, Commercial July 20-22
London, Olympia Show .....Oct. 13-22
Glasgow, Scottish Motor Show..Nov. 11-19

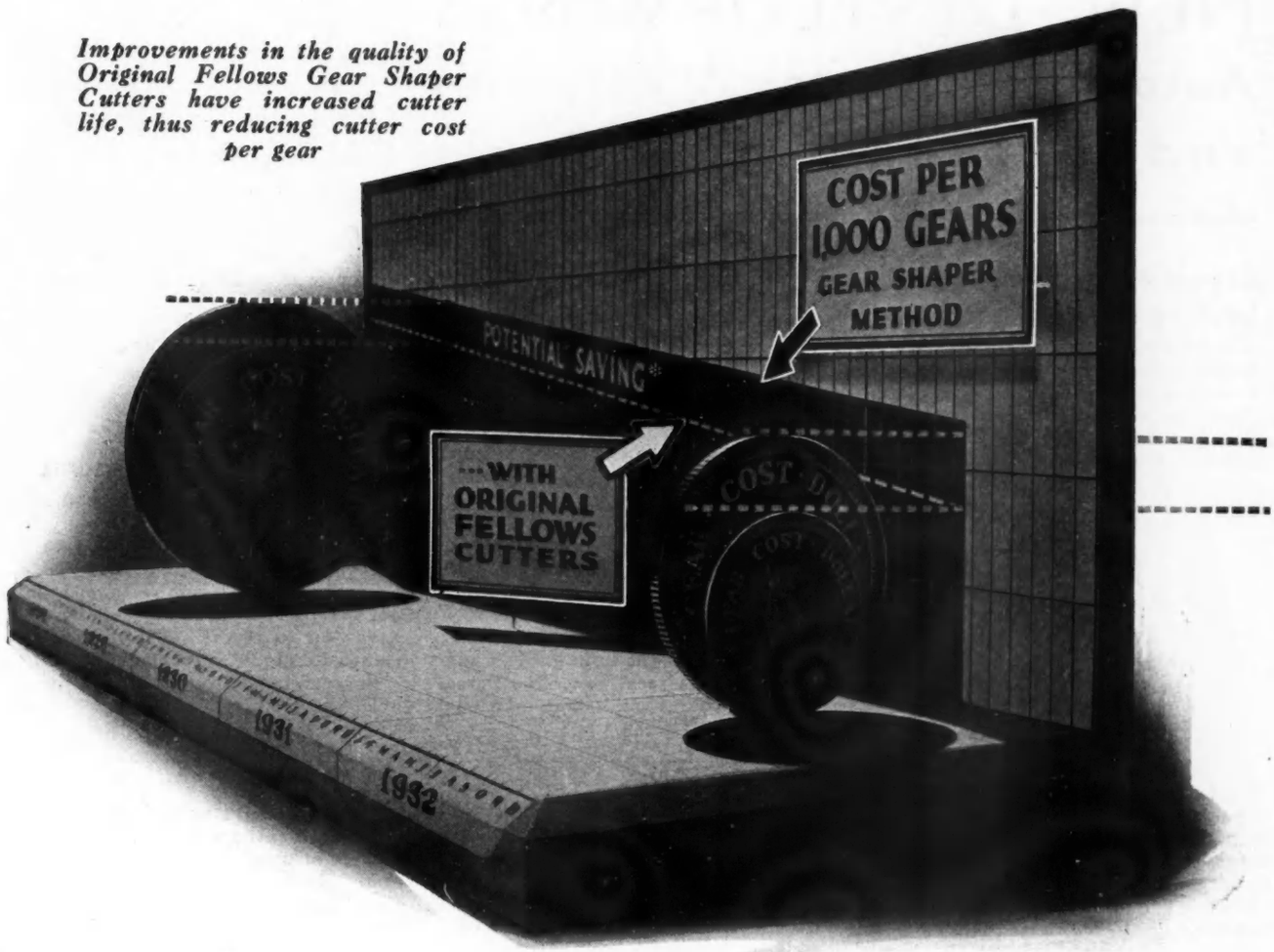
CONVENTIONS

National Team & Motor Truck Owners Assoc., Chicago (Annual) .....July 17-19
National Team & Motor Truck Owners Assn., Detroit ....July 17-19
American Chemical Society, Denver, Colo. .....Aug. 22-26
S.A.E. Aircraft Meeting, Cleveland .....Aug. 30-Sept. 1
American Society Mechanical Engineers, Cleveland, Ohio (Machine shop practice meeting) .....Sept. 12-17
American Trade Association Executives, Atlantic City (Annual) .....Sept. 15-17
Penna. Automotive Assn., Harrisburg, Pa. .....Sept. 19-20
Natl. Assoc. of Motor Bus Operators, Chicago .....Sept. 22-23
American Electric Railway Assn., Chicago, Ill. .....Sept. 22-23
Amer. Institute Mining & Met. Engrs. (Petroleum Division), Dallas, Texas .....Sept. 30-Oct. 1
Amer. Society for Steel Treating, Buffalo .....October 3
Amer. Institute Mining & Met. Engrs. (Iron & Steel Division), Buffalo, N. Y. .....Oct. 3-6
National Safety Council, Washington, D. C. .....Oct. 3-7
American Welding Society, Buffalo, N. Y. .....Oct. 3-7
American Society Mechanical Engineers, Buffalo, N. Y. (Natl. Iron and Steel Meeting).....Oct. 3-8
S. A. E. Annual Transportation Meeting, Toronto .....Oct. 4-6
American Gas Association, Atlantic City (Annual) .....Oct. 10-14
Natl. Hardware Assn. (Accessories Branch), Atlantic City, N. J. .....Oct. 17-22
Natl. Tire Dealers Assoc., Atlanta, Ga. .....Nov. 14-16
American Society Mechanical Engineers, New York City (Annual Meeting) .....Dec. 5-9
Natl. Exposition of Power & Mechanical Engineering, New York .....Dec. 5-10

RACES

Altoona .....Sept. 5

Improvements in the quality of Original Fellows Gear Shaper Cutters have increased cutter life, thus reducing cutter cost per gear



CUTTER COST PER GEAR

—Is Now Lower Than Ever—

Insist on

ORIGINAL FELLOWS GEAR SHAPER CUTTERS

FELLOWS

~ GEAR SHAPERS ~

. . . with Original Fellows Gear Shaper Cutters . . .

Continuous improvements in the quality and accuracy of Original Fellows Gear Shaper Cutters have contributed towards a marked increase in cutter life. Cutter cost per gear is now considerably less than it was five years ago; so that today you get gears of greater accuracy; more quiet in performance; and at much lower cost.

These advantages are proving especially gratifying under present conditions. Your scheduled output can be obtained from fewer Gear Shapers, with lower overhead expense and a direct saving in production costs. Now is the time to get ready for future increases in production. Ask to have one of our representatives call and counsel with you. Write: The Fellows Gear Shaper Company, 78 River Street, Springfield, Vermont (616 Fisher Building, Detroit, Michigan).

NEW DEVELOPMENTS
Automotive Parts, Accessories and Production Tools

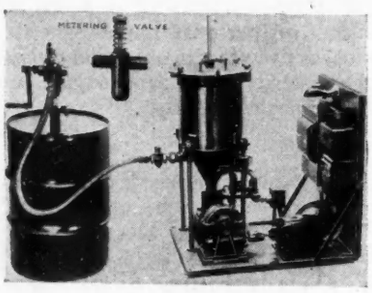
Bayonne Extruded Locking Nut

A locking nut which depends upon extremely simple means to prevent it from coming loose as a result of vibration is manufactured by the Bayonne Bolt Co., Bayonne, N. J., and is illustrated herewith. It is said to be the only locking nut that is absolutely standard and fits any bolt thread.

No extra parts are required and threads are not special. As may be seen from the illustration, an ordinary nut is slightly deformed so its upper end is slightly elliptical instead of circular, and, in addition the thread is slightly distorted, which causes the nut to grip the threads of the bolt and hold firmly. These nuts are made in all sizes from ½ in. to 2 in. in both S.A.E. and U.S.S. threads.

Hills Single Line Multifeed System

The Hills-McCanna Co., Chicago, Ill., has developed a system for the mechanical application of light greases and heavy oils to points requiring regular lubrication. This completes their line of equipment for lubricating any type of machinery that requires regular amounts of oils and greases.



It is a single line system with the main unit placed in a convenient location and a single feeder line taken to the farthest point requiring lubrication. Branch lines are then taken from the main line to each bearing. No return line is required. An independent mechanical measuring unit is placed at each bearing.

The measuring valve allows only a predetermined amount of grease to be fed to the bearing, and then acts as a shut-off. Regardless of the amount of pressure in the line only that amount the valve is set for can pass to the bearing.

The systems can be motor driven, mechanically operated, or operated by a hand crank. The type depends upon the service.

The Single Line Multifeed Systems will handle all of the light greases and heavy oils in general uses. The Force Feed Lubricators will handle light oils and the Mill Type Grease Pump will take care of the heavy greases. All of the systems are pressure types, and based on the metering principle.

Lincoln Totally Inclosed Induction Motor

An improved totally inclosed fan-cooled induction motor has been added by The Lincoln Electric Co., Cleveland, Ohio. The chief feature of the type E motor is a stainless steel, corrugated stator and frame inclosure. It can be readily cleaned and is resistant to the attack of moisture and acid fumes. The type E motor is made in sizes from ½ to 50 hp.

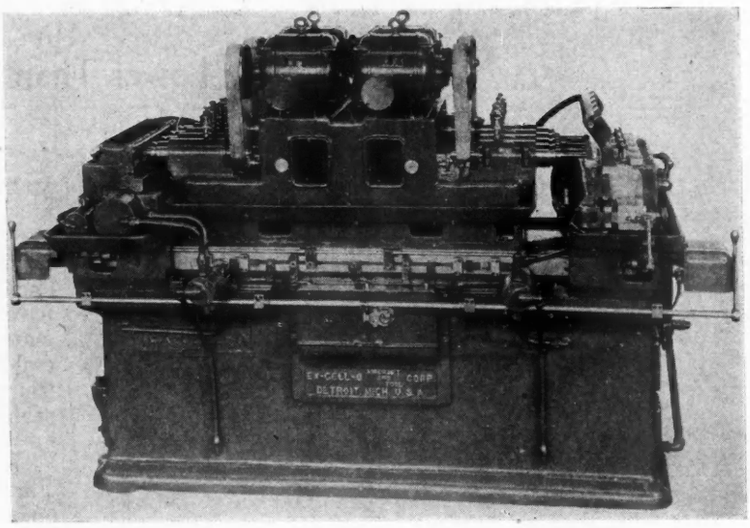
I-R Cameron Motorpump

The Motorpump, a line of pumping units with built-in electric motor, has been placed on the market by the Ingersoll-Rand Co., Phillipsburg, N. J. Capacity ranges from 5 to 800 gal. per minute in sizes from ¼ to 25 hp.; heads up to 100 ft. The unit is designed to handle any type of liquid.

Several types of motors are available.

Application for Ex-Cell-O Precision Boring Machine

By replacing the individual motor-driven boring units of the Ex-Cell-O Precision Boring Machine with Ex-Cell-O Internal Grinding Spindles and suitable holding fixtures, a high production machine has been developed by the Ex-Cell-O Aircraft & Tool Corp., Detroit, Mich., for grinding the relief on each side of the inside diameter in the large end of connecting rods.



The illustration shows the complete machine with two banks of four internal grinding spindles mounted on each end of the unit base which in turn is mounted on the fixture table. Four electric motors are mounted above and between the two banks of spindles, each motor driving two grinding spindles.

At each end of the machine is mounted a full hydraulic fixture for holding four rods during the grinding operation. These fixtures are mounted rigidly on the bridge rails of the base and are indexed from side to side hydraulically. The length of the indexing stroke from side to side is adjusted by turning the hand knob at the side of each fixture.

Here's the NEWS about GOODYEAR Type K Rims

Until Goodyear built truck tire rims this way, tire-changing was a time-wasting, back-breaking struggle.

But Goodyear puts a transverse slit in the base — with a continuous, locked-on ring for strength and safety.

Note open-end valve slot — a valve-saver.

You can standardize on Type K Rims — they fit any truck, one-ton or five-ton.

For full data, write to Rim Department, The Goodyear Tire & Rubber Company, Inc., Akron, Ohio.

K-28

for 28° bevel mountings
Sizes: 5", 6", 7", 8" and 9-10"

"THE MAN WHO CHANGES THE TIRES LIKES K RIMS"

GOODYEAR

K-28 RIMS K-18

NEW DEVELOPMENTS
Automotive Parts, Accessories and Production Tools

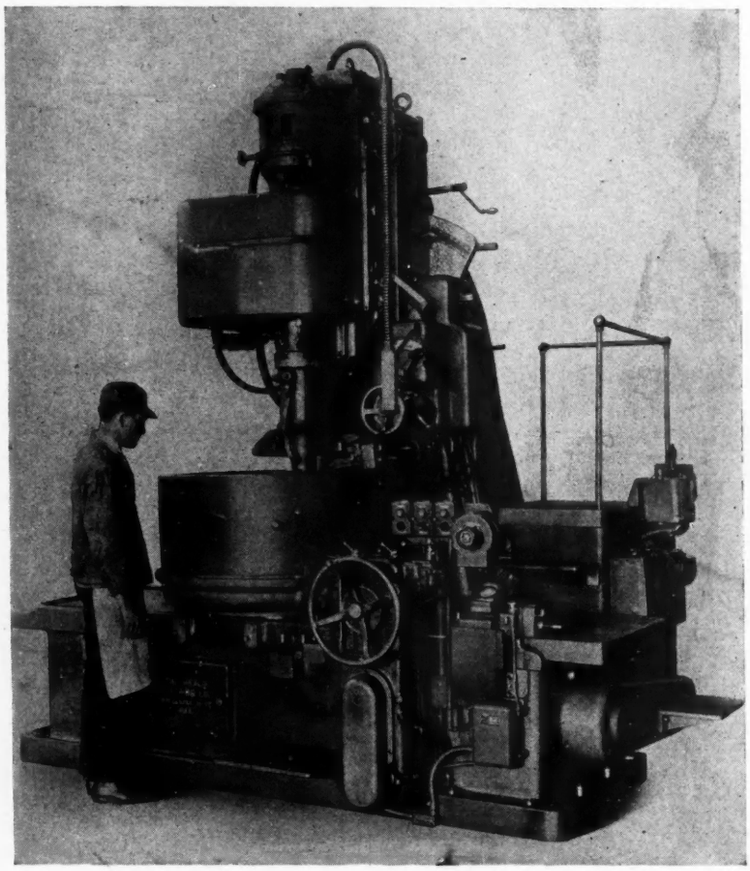
Heald Vertical Internal Grinding Machine

The Style No. 90 Heavy Duty Vertical Internal Grinding Machine has been designed by The Heald Machine Co., Worcester, Mass., for accuracy on large work where it is desirable to grind in a vertical position rather than horizontal, particularly where the part is awkward to handle or there is much overhang. It will grind straight or taper, internally or externally, as well as face grind.

The drive to the wheelhead can be furnished in two ways. That shown is through an idler pulley arrangement necessary where a considerable range of spindle speed is required. Usually on large heavy duty spindles with larger wheels, the wheelhead would be directly coupled to the motor and this idler and belt arrangement would be eliminated. The vertical wheelhead slide is operated hydraulically and controlled from the reverse control valve arrangement conveniently located to the right of the head.

The entire vertical slide is counterbalanced hydraulically by an arrangement of valves. This arrangement gives uniform speed up or down at any particular throttle opening; also equalizes the hand effort required to move the slide up or down.

A 25 hp. motor is shown mounted on the wheel slide for driving the wheel and furnishes ample power for heavy work. The entire hydraulic system is operated from an independent motor, driving the pump located on the lower right-hand side of the column.



The machine shown in the photograph is the 36 in. size and is shown with a 36 in. face plate. It may be furnished in two general sizes, 36 in. and 48 in. Each of these machines has five different standard heights of column, giving a clearance of 15 in., 18 in., 24 in., and 38 in. between the diamond and the face plate. These machines may be furnished with either a 22 in. or 31 in. grinding stroke.

Improved Rod for Electric Welding Stainless Steels

A welding electrode for 18-8 rustless steel has just been announced by Joseph T. Ryerson & Son, Inc., Chicago, Ill. As a result of tests and experiments that have been made, it is claimed that the rod will give uniform, satisfactory results.

Chiefly responsible for its performance is a special flux coating producing a non-active gas which surrounds the hot metal and prevents the oxygen of the air from attacking the metal and forming oxides. The heavy slag formed on top of the weld acts as a protective agent as the metal cools. A precision measuring device applied to Cincinnati Milling Machines, by the Cincinnati Milling Machine Co., is said to adapt the machine for jig boring and die sinking.

It is also useful for precision-boring small or moderate size lots where it is desirable to hold close limits on spacing between holes, within a very limited range. It is possible to finish-bore holes accurately spaced within one-half thousandth (0.0005) of an inch.

The complete equipment consists of one dial indicator, one micrometer head and a set of standard measuring rods for each movement; cross, longitudinal, and vertical. The dials are covered and protected. Brackets and vee block hold the measuring rods and micrometer head, which are placed between the adjustable stop and dial indicator attached to the table and saddle (longitudinal movement).

H & G Stationary Die Head

Following the successful introduction of a line of self-opening die heads with replaceable chasers, the Eastern Machine Screw Corp., New Haven, Conn., has placed on the market a new type of stationary head. The chasers and other feautres of the style MS head are the same as on the model MM line.

The new die head is designed to meet the needs of hand turret lathes and similar machines where the die head does not rotate.

New Oxweld Regulators

The Linde Air Products Company, New York, N. Y., has added two new regulators, the Oxweld Type R-48 Oxygen Regulator and the Oxweld Type R-49 Acetylene Regulator, to its line. These regulators have been designed to meet the needs of light duty, particularly for use with the Oxweld Type W-15 Welding Blowpipe in the Oxweld Sheet Metal Welding Outfit.